Bob Cooper's

AUGUST 15 2000

SatFACTS

MONTHLY

Reporting on "The World" of satellite television in the Pacific and Asia

IN THIS ISSUE

SPECIFIC CHANGES in IRDs

Australia would ban CA/CI IRDs

BENJAMIN DB 6600CI Tests

- ✓ Latest Programmer News
- ✓ Latest Hardware News
- ✓ Latest SPACE Pacific Reports
- ✓ Cable TV Connection

Vol. 6 ◆ No. 72
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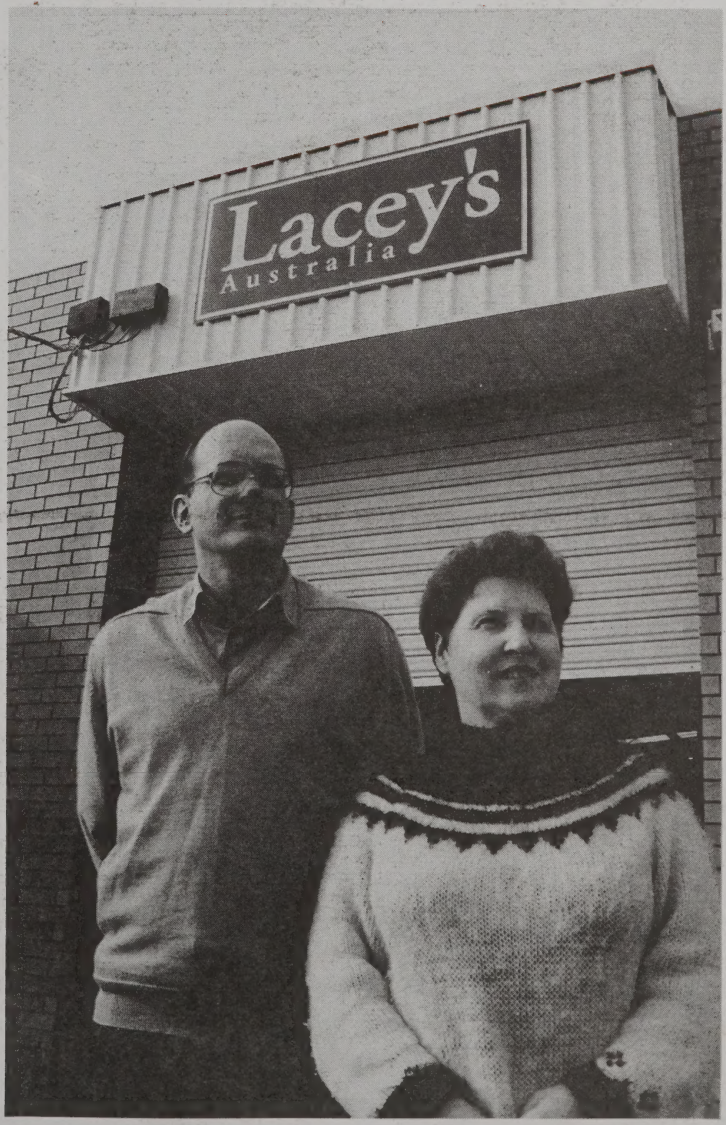

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(updated August 15, 2000)

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Satellite to room - Commercial SMATV (Satellite) Dish Installations. The easy part is the satellite dish or dishes. The difficult challenge is getting all of those signals - including the terrestrials - balanced and into every room and each TV outlet at the proper level. If you plan to do multiple-outlet systems, start here with this Coop written tutorial. LtdQty and only $10 per copy while they last! (SPACE discount)

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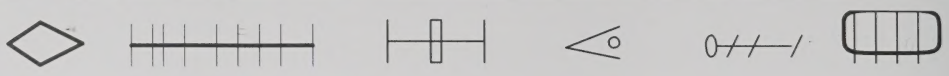
SPACE Pacific Terrestrial TV Reference Materials



Each of these editions researched, created by "Coop" to help you solve tough aerial problems

TB 9301 — **Tech Bulletin 9301**. *Co-Channel & Antenna Phasing*. How to grow a single antenna (Yagi, broadband antenna) into a complex array to greatly increase gain, sharpen receiving pattern to eliminate co (same) channel interference. Totally hands-on, very practical, up-to-date. Go from novice to professional!

TB 9302 — **Tech Bulletin 9302**. *Weak Signal Reception Techniques*. If one cut-to-channel (Yagi) antenna won't do the job, will 2, 4 or 8??? How about 16? Stacking antennas, mating with carefully selected masthead amps, is an art. This explains how to do it for professional results up to 300 km from TV stations.

TB 9303 — **Tech Bulletin 9303**. *UHF - The Frontier*. Using parabolic style antennas surfaced with low-cost poultry mesh, build UHF dishes up to 40 feet in size to extend UHF off-air reception out to 300 km. And - learn the tricks to "squirt" signals from a hilltop to a valley below using low-cost receiving equipment.

TB 9304 — **Tech Bulletin 9304**. *Beating Noise Interference & Combining Cross-Pole Signals*. When TV and FM signals are weak, man-made interference from appliances, power lines can kill reception. Step-by-step instruction for identifying, locating, fixing noise sources + unique method of combining cross-pole TV signals.

TB 9305 — **Tech Bulletin 9305**. *Cable Television - Fact & Fiction*. The story of how a cable TV system is designed, built, operated. The perfect "So this is how it works!" report. Who knows - you might even like the concept so well you take out a mortgage on your home and wire your town!

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NOTE! — **NEW to ABA Terrestrial TV Blackspots?** Order TB9301/9302/9303/9304/9305 "Special Package" below ($40) to quick cram ALL of the problems associated with "ABA Proof" of Blackspots!

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MONTHLY

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This publication is dedicated to the premise that as we are entering the 21st century, ancient 20th century notions concerning borders and boundaries no long define a person's horizon. In the air, all around you, are microwave signals carrying messages of entertainment, information and education. These messages are available to anyone willing to install the appropriate receiving equipment and, where applicable, pay a monthly or annual fee to receive the content of these messages in the privacy of their own home. Welcome to the 21st century - a world without borders, a world without boundaries.

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COOP'S COMMENT

August 15, 2000

A man walked into a Sydney suburban satellite shop and handed over his business card. "*Bill Taylor with the Australian Film and Video Security Office*," he announced. "*I want to talk with you about some satellite receivers you are selling*."

Mentioning by brand and model, he cited one from Benjamin (photo, right) and another from Skyvision. "These are illegal," said he, "because they allow you to plug in a CAM and a piracy smart card." His point of reference is new legislation passed on initial reading by the House; "Copyright Amendment - 1999/digital agenda." The law is not "law" *yet* but it is likely to be passed in final form in mid-August as the Australian Parliament returns.

The legislation wants to further define "pay TV broadcast decoding devices" and computer programs "designed to enable a person to gain access to an encoded broadcast without the authorisation of the subscription broadcaster." There is one frightening word in the legislation: "facilitate." It would make it a crime to "facilitate the circumvention" of decoded pay TV services. The Concise Oxford Dictionary defines facilitate as follows:

"(to) make easy or less difficult or more easily achieved."

What concerns legitimate sellers of CI or CAM equipped IRDs is that by selling such a receiver, they could be charged with "*facilitating*" piracy. Why? Because if the IRD is CAM-able or CI-able, the law *could* be interpreted to make sellers of such equipment culpable as "facilitators" (see page 2, SatFACTS http://www.satfacts.kwikkopy.co.nz)

I went to Annabelle Herd, an attorney attached to the office of Senator Allston (tel 03-9650-0233) to discuss this. I explained that IRDs are designed for a world market, Australian importers do not specify the functions or participate in their design. We get IRDs with many features in them we don't want, and missing some we do want (see p. 6, here). We asked her point blank, should importers of these sets be concerned?

"Perhaps this needs to be looked at more closely but at this point (July 17) I cannot give you my assurance that an importer of such an IRD (or reseller of the IRD) would not be deemed to be a facilitator. It may turn on whether free to air or pay TV is the primary purpose for the receiver."

Jacob Keness of MediaStar has been leading an education campaign to convince legislators that this is "wide net legislation" that will catch Tuna and Dolphins simultaneously. Leon Senior of Strong Aust believes the only way CAM-able or CI-able IRDs can be sold after such legislation is in effect is to make every person who buys such an IRD (at dealer and retail level) sign an affidavit stating they are buying it for FTA use. None of this touches on the spot Nationwide will find themselves in as they sell UECs for Aurora. This is bad legislation with an evil intent and it should be corrected. And the guy from the Film Security Office is on a fishing expedition without a net.

In Volume 6 ◆ Number 72

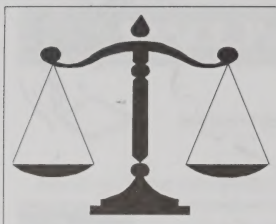
What we REALLY want in IRDs! -p. 6
Review: Benjamin DB 6600CI -p. 10
Interaction of terrestrial antenna "elements" (part five) - p. 14

Departments

Programmer/Programming Update -p.2; Hardware/Equipment Update -p. 4; SPACE Pacific Report (Auckland's dish revolt) - p. 20; Cable TV Connection (How far can you go?) - p. 22; SatFACTS Digital Watch -p. 24; Supplemental Digital Data -p. 26; SatFACTS Analogue Watch -p. 27; SPACE Pacific Report - TV Show schedule -p. 28; With The Observers -p. 29; DirecTV in America- p. 31; At Sign-Off (SA is playing games - *again*) -p. 32

-ON THE COVER-

The Lacey family of Lacey's Australia, Peter and Glenda, hard on the trail of becoming "the" national supplier of satellite and DVB-T antennas and hardware; a "mom and pop" business finding that success comes from personal attention to customer needs.



LETTERS

Another LNB view

"While dropping an LNB(f) may not be the smartest thing to do (SF#71, p. 28), I have found it is not parts that work loose but rather the DRO (local oscillator) ceasing to function. There may be a similarity between ceramic resonators and home consumer remote controls which often fail to work after a moderate fall to a hard surface. Most remote manufacturers use a 455kHz ceramic resonator as they are also mass produced for AM radios. If there is a fault, the resonator cracks (literally) but still may work intermittently. As for using a microwave oven as a "test signal source" for an LNB(f) at C-band - it does work but caution people to 'load' the oven with at least a tumbler of water since an empty oven running creates high standing waves which can leak back through the rotating microwave dispersal blade to damage the magnetron power source. Finally, one suitable LNB mouth cover is the 'roof liner' made for microwave ovens. WES components (www.wescomponents.com) sells this item; cut it slightly oversize, attach to the feed around the outside with roof and gutter silicone (natural cure silastic). Drill a few holes in the cover to allow moisture to seep out as condensation in a sealed feed can be a worse problem than spiders!"

Al, Queensland

To which we add correction of a small 'typographical' error on p. 28, SF#71. Towards end of 5th line should have read "...not capable of sustaining heavy stresses..." rather than"...not capable is sustaining... ."

Still making individual LNBs

"Reference the SPRSCS session on LNB designs, enclosed a test sheet from the Yoko brand LNB; each unit has individual test results through the band of interest. I was very impressed with the show, will be looking forward to 2001. Michael Barry and Ray Treloar from ABA certainly cleared up questions I had about Central 7, Imparja and my customers."

Bob Murray, Murgon Aerials, Georges Plains, NSW

The Yoko test sheet measures gain (dB) and noise figure (dB) at 20 frequencies spread from 12.237 through 12.750 GHz. It shows gain varies between 54.26 and 55.89 dB while Nf ranges between 0.81 and 0.97 at 27C (temperature), relative humidity 45% and a current drain of 157.5 mA. Knowing the precise parameters of an LNB can be critical to making a system perform properly - the SPRSCS session pointed out that most (we said all - Bob Murray corrected us) manufacturers have reverted to a "best case" claim for units (in this instance would be 0.81 dB) which is only a "partial" truth. The source for this "old fashioned" device is John Marsden, Television Broadcast Engineering, 10 Whites Road, Glenorie, NSW 2157 (tel 02-9652-2290).

PROGRAMMER PROGRAMMING PROMOTION UPDATE

AUGUST 15, 2000

16:9 format video. Central 7 through Aurora platform does run wide screen (16:9) programming from time to time - but requires appropriate TV monitor and quick (UEC) manual change from 4:3 to 16:9 to enjoy in its advanced format.

Did not go well. CMT conversion to PAS-8 (from PAS-2 California Bouquet) in mid-July was not total success. Several readers report their D9223 IRD, moved from PAS-2 and loaded to PAS-8 "California" bouquet (3940Hz, Sr 27.690, 7/8) refuses to work. Step one: confirm Network ID number (8002). In fact, earlier version D9223s, bought through Telsat when CMT converted from D9222 to D9223, have a built-in "spectrum inversion" problem when you try to use them in DVB mode on this particular transponder. One fix (although not complete) is as follows: (1) Menu, (2) User, (3) Next, (4) Yes, (5) 6 which gets you to semi-hidden menu that at bottom shows "User." Using 'user' button, toggle until it says MPEG (other choices - DVB, PES PID), push 'save,' then 'view.' Now you should have FTA reception on channels 2 (EWTN), (3) EB Net), possibly 5,6,8,9, and 10 (PanAmSat Napa card). However, this transponder *really* wants to be received in DVD mode which older generation D9223s will not handle without an 'OS Download" sent to your receiver from PanAmSat Miami. How to do that? Contact Javier at email josma@panamsat.com. And, see p. 32 here.

Zee's invasion. Zee TV held a Sydney press conference in mid-July, announced 6 channel service to be relayed from As3 through Optus B3's Aurora project (12.532Vt) which covers NZ as well with 90cm dish levels (Irdeto of course - no confirmation of how the receivers will be sourced). Tests were first announced for August 1, indeed Aurora showed six new programme channels (54 - 59) established for Zee July 29. Sydney telephone number is (02) 9419-8522 or 133 036. On August 1, NZ office opened (09-627-4933) where R. Mansur is quoting "$1,000-$1,200 installation using 85cm dish" with NZ rates of $11.30 per week on "12 to 24 month contract" using direct bank account debit (NZ$587.60 for 12 months). That's four channels (Zee Movies, News, Music and Entertainment) with optional language channels "at nominal $3-5 per month." Australian-domiciled Indians have many FTA options of course (Thaicom 2/3, InSat 2E, AsiaSat 3) whereas NZ Indians have only limited As3 FTA possible service. No, Zee's English language channels ("Zee English" and "Zee English Movies") are not a part of the package.

Unconfirmed. Reports that Austar operations and customer service computer system crashed July 29th for nearly 72 hours - rumour has it they were trying to shut down piracy cards at the time of crash with a "new" programme.

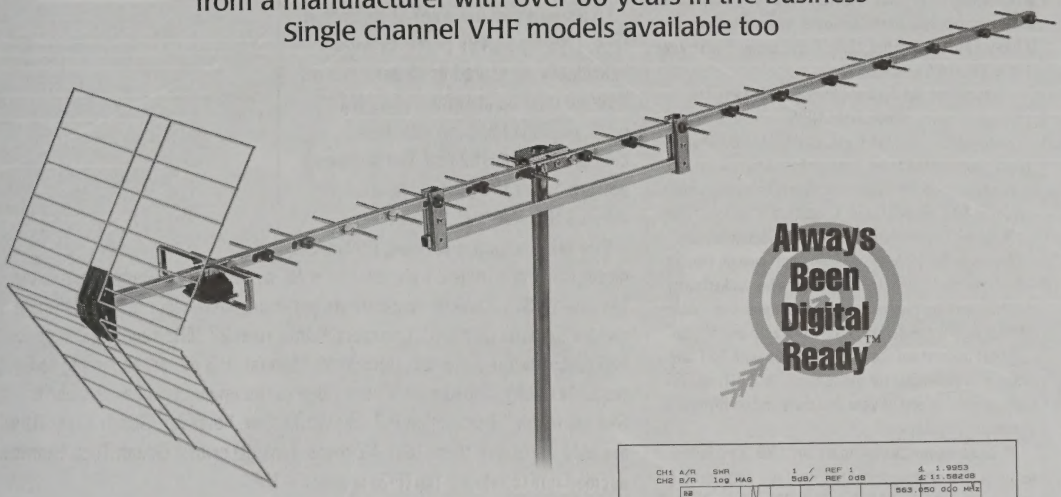
MeaSat 2 Ku tests to Australia. For last ten days of July, testing Ku beam spotted on eastern Australia with eirp as high as 52 dBw (a couple more than Optus). "Invasion" works - dishes to 30cm had headroom from Adelaide to Brisbane. Check in Wellington found 4dB carrier to noise on 1.8m so NZ is likely out. Tests were for Optus friendly Mediasat which could lease 2 transponders from Malaysians simply because, "Optus has run out of room."

RTPi (Portugal) plans to join As 2 European Bouquet January 22 (2001). Bouquet is reducing bandwidths for present users (DW, MCM, TV5, RAI, RTVE), will squeeze up to 3 new video programmers in and has signed 5 year extension of original As2 agreement. Effects? Likely lower bouquet signal levels, loss of service for marginal dish users. RTPi analogue, also As2 3980Vt, will shut down.

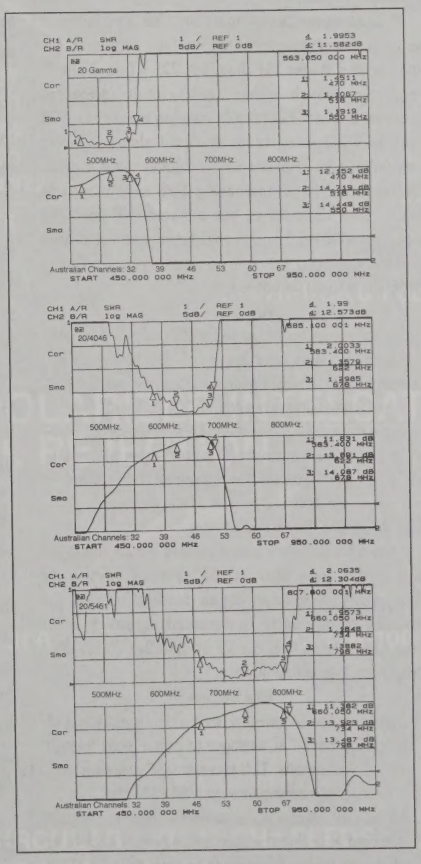
French C-band I701 (4095LHC) down graded as reported to Sr 13.343, 5/6 with lower power (20.5 dBw) July 1. Hold on - going down to 15.5 dBw shortly!

Something New Under the Sun

Precision production means our performance meets our frequency response traces
Seventeen different UHF narrow band models available from stock
from a manufacturer with over 60 years in the business
Single channel VHF models available too



Always Been Digital Ready™



Ever needed that little bit of extra TV signal? By designing antennas for a narrower range of TV channels, Fracarro has been able to attain performance that has not been available from off the shelf antennas, for years.

Most antenna manufacturers claim to make 15dB models, so why do increasing numbers of professional installers ask for Fracarro? How can such skinny antennas beat a chunky 90 element? Don't take our word for it!

If you work in a built up area and don't use an TV instrument with your antenna work, be warned: you might never notice the difference. However, if you like to do a better job whilst saving money, and occasionally have trouble with snowy pictures, we have something for you. Our catalogue No. 102 is jam packed with TV reception goodies, and can help you select the antenna most suitable for the channels in your area.

We have included some actual frequency response vs. reflected power traces here to help paint the picture. No enhancement or alteration of the traces has been made.

For still more gain we have stacking couplers that enable two or four antennas to be coupled with virtually no insertion loss. Amplification? well that's another story.

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Shame on the organisers

"I reckon you got it wrong (SF July, p. 1); 'shame on the organisers' of your satellite show in Melbourne. Those of us in business to run could ill afford the time to attend an interstate show 2 days prior to the end-of the financial year not to mention the start of GST. The organisers showed a distinct lack of foresight in scheduling the event and should not be complaining about the attendance. I am sure many interested businessmen like myself would have attended had it been held at another time. I will attend next year if it is held in September."

Steve Errol, DJ Coulter (Wholesale Div) Pty Ltd.
Newcastle, NSW

Shame on us. But the facts. Box Hill Institute was a given - we wanted to be there and as it turned out, this was a proper choice. Alas, that means selecting a show date that falls inside of their school break periods. There was the 'Easter' period, late June, September and Christmas. Easter was too soon - not enough time to plan it properly or promote it, September looked dicey because of the Olympics while Christmas was - well, Christmas. We understood the risks with end of year, did not understand the extra workload with GST and thus are responsible for the turn out. In 2001, no GST adjustment, no end of year decisions and no Olympics.

Three pin regulators

"I have never taken apart an LNB and found it using a discrete zener diode voltage regulator for the various stages (SF July, pp. 22). I find 3 pin IC regulators which either open circuit (draw no current) or short to ground (drawing more than 500 mA). In VCRs using zener diodes, I also can never remember the reference zener going open circuit. On the other hand, increasing LNB supply voltage from 13 to 15 to 18 as you suggest will normally have a (relatively) small change in current drawn (as you suggest) but not necessarily indicating a problem (as you do not suggest)."

NS, Victoria

We are remiss for not properly pointing out that zener diode regulators have disappeared from many LNB products and that 3 pin regulators are now the common approach to voltage regulation. The real point here - perhaps missed - is that if an LNB(f) is measured (and the results written down) for current drain when first installed, it becomes a handy reference for failure trouble shooting at a later date.

Ten Australia Compression

"The TEN Network video quality off-air analogue has gotten very poor in the past 30 days or so suggesting they have begun feeding around the country using overly compressed digital. It looks like FTA service Fashion TV on AsiaSat 2 - hardly a benchmark for good quality."

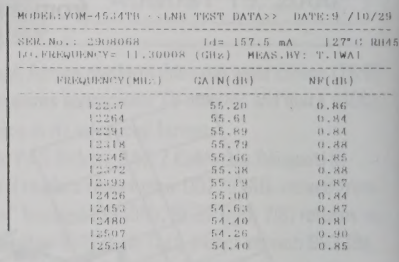
Paul Hadlow

All Australian commercial networks are in process of switching from E-PAL analogue to digital feeds through Optus. Additionally, TEN receives USA originated or linked programming through I701 (3765RHC, Sr 29.900, 7/8). Once a digital signal has been compressed 'too hard' it is almost impossible to bring it back to a high quality image. These could be early days for TEN's new digital intra-Australia feeds or you may be witnessing another reason why DVB-T is going to be a tremendous challenge when it launches.

HARDWARE EQUIPMENT PARTS UPDATE

August 15, 2000

LNBs you can believe? Once upon a time, LNB and LNBF products were individually measured as to performance through their bandwidth. Prices fell, quality dropped and individual characterisation stopped. But perhaps not totally, as this partial sheet shows. Where? See letter, p. 2 here.



MODEL:YOM-4534TB - <LNB TEST DATA>> DATE:9 /10/29

SER.No.: 2980068 Id= 157.5 mA 127°C RH45%
LO:FREQUENCY= 11.30000 (GHz) MEAS.BY: T.IWAI

FREQUENCY(MHz)	GAIN(dB)	NF(dB)
12247	55.20	0.86
12264	55.61	0.84
12291	55.89	0.84
12318	55.79	0.88
12345	55.66	0.85
12372	55.38	0.88
12399	55.19	0.87
12426	55.00	0.84
12453	54.63	0.87
12480	54.40	0.81
12507	54.26	0.90
12534	54.40	0.85

Sky NZ's unusual format. Prolink-3 meter is being withheld from release in NZ by distributor Gough Tech Express because of Sky's unique two-carriers-per-transponder approach to MPEG-2. Sky divides 54 MHz Optus B1 transponder into twin 27 MHz segments, then loads each half-piece as if it were half transponder format. P-3 meter, according to Gough and tests, "exhibits measurement errors due to the unique two-carriers-per-transponder Sky approach." Companion P-7 unit works fine, however. Gough says, "Until Promax are able to resolve these (Sky NZ measurement) errors, Gough Tech Express has decided not to release the (P-3) product in NZ."

Date and time stamp. Perhaps useful suggestion coming out of SPRSCS 2000 IRD design session; when transponder is updated to memory list, automatic "date + time stamp" appears as reminder of last time this particular service was brought current. Side benefit - when user claims, "I never touched it!" in defence of IRD faulting, stamp would be useful tool for installer to "*prove* otherwise."

Not encrypted - but. Within Europe, most EBU (European Broadcast Union) feeds now use a variant of MPEG 2 called MPEG 4:2:2. The difference is chrominance signal (colour) is sampled twice as often in the vertical (line to line) direction. On a standard MPEG-2 IRD, result is badly tiled reception even when signal is strong in best case, to no reception at all (suggesting - in error - CA). Solution is pricey Standard Communications MPEG 4:2:2 IRD created to process high bit rate double chrominance transmissions (US$3,000 up), also available in Europe as Alteia 942A (Link Research Ltd as DaveR@linkres.co.uk). High motion sporting events (such as upcoming Olympic coverage out of Australia) routinely use this format which has become defacto standard for professional broadcasters linking feeds. 4:2:2 - perhaps something to be added to our "Industry Wish List" for IRDs of the future??? (p. 6, here)

Cable testing. "*There is no 75 ohm cable (of any size or type) currently tested beyond 3 GHz. It is not that it could not be, there is simply no industry standard to do so.*" So says cable manufacturer concerned about attempts to utilise these cables at frequencies for which there has been no testing done. During SPRSCS 2000, an interesting side discussion concerning cable integrity versus cable types mandated by installation firms such as Comet. "*It seems to be who you know, not what your cable does, to get it on the 'approved' list,*" laments one would be supplier for Foxtel and Austar installations.

Speaking of Comet. On heels of our report (p. 32) in SF#71, the Australian contract installation firm has acquired 60% of NZ contractor and terrestrial aerial manufacturer Strongline Communications Ltd, has sights set on several others who deal with Sky Network NZ. In mid-July. Comet announced acquisition of Walters Communications, Satellite Receiving Systems (Queensland), Evcom and Delancy Trading. And, Comet is signed to do ZeeTV installs in Australia and NZ.

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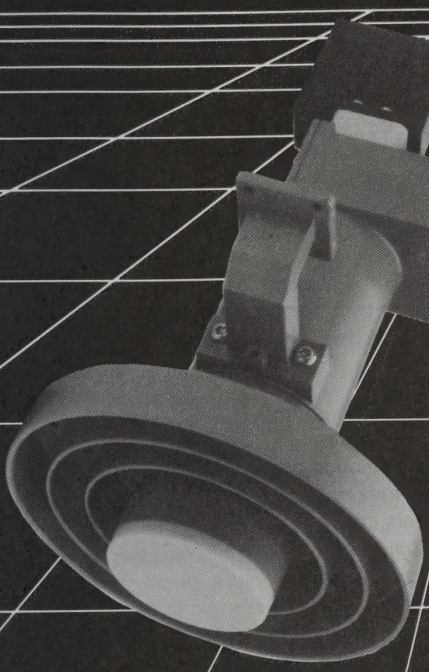

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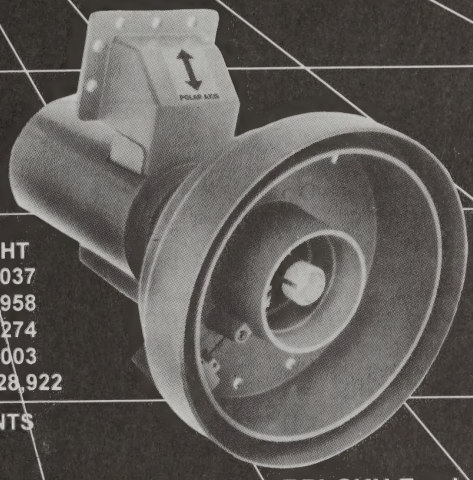

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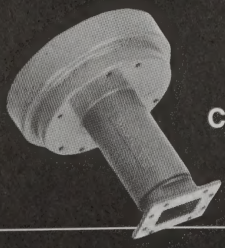

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THIS IS WHAT WE WANT!
IRD design suggestions from SPRSCS

Many believed the "most challenging" conference session at this year's trade show was conducted by Av-Comm's Garry Cratt. We called it, simply, "*Receiver Revolt - what we really need is ...*".

A summary of the "wish list" receiver appears below. The separate items and their reasons follow.

1) Detachable power cord: Ever try to get an IRD into a stereo or other cabinet with a small hole cut for a power plug? Often impossible to get the plug out of the enclosure without removing the mains plug.

2) On/Off switch: Need to reboot the IRD and can't reach the AC mains plug buried behind a stack of equipment?

3) SMPS power supplies: Cratt suggested, "I would like to suggest a movement for returning to linear power supplies." The reasons are many. Power supply 'hash' noise to VHF reception, high failure rate of SMPS supplies, unfortunate SMPS design parameters which are for 90-230VAC whereas Australian mains are 240 volt standard, allow +/-6% increases (now 254 volts) and in Western Australia 260VAC is common. Combine 250+ volt AC with 50C ambient temperatures and you have SMPS failures. See extended discussion, p. 8 here.

4) Easier to use menu layouts: Difficult to quantify. Every IRD now available has its detractors but universal agreement

Abbreviated short-form list for busy readers

1) Detachable mains power lead
2) On/off switch on mains supply line
3) More reliable power supplies (see extended discussion here)
4) Easier to use menu layouts (extended discussion)
5) 4 digit access code only for operational changes (extended discussion)
6) On screen UHF modulator channel and frequency
7) Solve interference problem to amplified, loop-through FTA channels combining with internal modulator
8) Programme channel by channel audio output parameter memory
9) Alternate audio access (Bloomberg example)
10) 2 to 45 mega symbol rate standard
11) NTSC to PAL in software with default to PAL output to match Pacific region TV sets
12) 22 kHz, 0/12 volt switching per transponder, not per satellite
13) Ability to easily rename or eliminate satellites found in menu which are not available in Pacific
14) Channel naming should be correct, not arbitrary (example: CCTV on PAS-2, As3 lists ch 1, ch 2, ch 3 etc.)
15) Analogue + digital + positioner receivers are not programmed logically (see discussion)
16) Ability to enter search limits (such as 950-1450 L-band), one or both polarities for complete logging search
17) Ability to research any given transponder to check for new programme channels in transponder; overwrite and correct list, do not create an additional menu list
18) Teletext should be standard on all receivers
19) Better on screen signal strength/quality readings (C/N as a minimum, BER better)
20) Auto(matic) peaking of dish using C/N or BER with positioners (example: Palcom 7700 on analogue)
21) Twin RCA video plus audio outputs in addition to SCART(s)
22) Solution to SMPS interference to (band I) VHF reception - not suitable to turn off IRD to view ABC on channel 2
23) Digital IRDs should have twin inputs, selectable, as most analogue receivers do to allow separate dishes to feed the same receiver
24) Faster channel changing in CI models/mode - yes we know this means a faster processor
25) An "abort" button to stop channel, transponder, menu selection in midstream
26) "Hard reset" from remote - when everything fails to restart an IRD, rebooting from handset rather than pulling AC mains plug
27) External replaceable fuse (not strongly supported) or circuit breaker (better supported)
28) End major changes between models resulting in "abandoning in place" older models with uncorrected defects
29) Two separate instruction manuals - one for installation, one for user. End confusing mixing of installation and operational data in same manual
30) A system to transmit "peaking signal" (tone) back to installer at dish

what we now have is not what we want and need. Suggestion made that menu designers get out of their computer labs and spend a few days investigating how people really use their products ("Ivory tower" syndrome).

5) 4 digit security code: Some suggested doing away with it entirely, at other end of spectrum, "Hide it, don't give it to the customer, they have no business trying to access the menus hidden behind the code." Cratt: "With every installation there is an implied warranty. They paid for the box, and like the key for a car, it has to be available to the user even if there is a chance they will screw it up." Suggestions: Separate the 4 digit code from normal IRD menu access functions, make it required only for changing, adding, deleting channels, satellites. Instruction manuals should specify the dangers with misuse of the code, warn users against 'playing'. See discussion of manuals to follow.

6) RF modulator: "Levels now mandated are all wrong: 65 dBuV +/- 10% is the wrong number. 75 dBuV should be minimum with 80 dBuV maximum." Videos, games have the same spec. Biggest installation problem: When amplified FTA service loops through IRD, the (FTA) amplifier generates noise on the UHF modulator selected channel. One "solution" has been to install external UHF trap to take out the UHF modulator 'channel' at input to IRD, reducing the amplified noise that feeds through and creates patterning on the modulated UHF channel. Having greater UHF modulator output could eliminate need for this 'fiddlie' trap. Another suggestion - IRD could have 'tracking filter' so that when output channel is selected, same channel would be 'filtered' on input eliminating need for external, installer supplied filter. Another suggestion: Loop through output combining FTA + modulator signals could be 75-80 dBuV and have built-in 2-way splitter to allow separate lines to be run to two TV sets without need for external line splitter. Also urged: Modulators should show both channel number *and* channel frequency on screen (set-up) menu - as UEC does.

7) Stereo/audio line memory: Most IRDs supply ability for both L and R outputs to be left, or right, or stereo, or stereo reversed. But you cannot put the selected choice into memory by programme channel. With many services running non-related audio or data on channel not selected for programme audio, this creates one-off reset requirement for users when they change programme channels. Not desirable.

8) Alternate audio: Some services (Bloomberg on PAS-2) run totally separate audio channels on audio layers "below" the normal L and R. Receivers (such as some SA versions allow) should find and offer "alternate audio" reception through an "alternate audio" (RCA) socket and/or SCART.

9) 2 - 45 symbol rate - standard: Some receivers offer 18-28 (30), others offer 2-18. The reality is all receivers should be 2 - 45 Ms as standard (examples given included Fashion TV on As2 at 2.533 as one extreme, California Bouquet on PAS-2 at 30.800 as another extreme).

10) NTSC to PAL in software: We live in a PAL TV set standard world. Yet some satellites have mixed NTSC and PAL services, sometimes within the same bouquet (California Bouquet, PAS-2). The default should be PAL format output.

11) 22 kHz, 0/12V switching per transponder: Most receivers allow selection and memory filing by satellite only. A dish installed with C + Ku together, orthomode feeds will have four LNBs. The installer needs the ability to select the switching format based upon the transponder, not the satellite with memory for that transponder to determine which switching format is used for each transponder.

12) Renaming satellites: OK, so we get receivers designed first for Europe, then as an after thought, for the Pacific. We accept that - even if we don't like it. Now, at least give us the ability to erase (delete / over write) factory installed satellites and transponders (Astro, Sirus etc.) that don't apply to us.

13) Channel renaming: Example - CCTV bouquet (PAS-2, As2). Software stops short of properly identifying the services - calls CCTV's various channels "channel 1," "channel 2" and so on rather than the proper CCTV4, CCTV3, CCTV9. Users need proper channel identifications to be able to use the receiver memories. Software creators are taking the "lazy way out" by only picking up the header on data streams.

14) Digital + analogue + positioner memories: No thought seems to have been given to how someone will use these combined features. Tune in a digital signal on a satellite, switch to the analogue menu, select a new channel "and the box tells the positioner to whiz off into the heavens." Cratt: "The most logical way of approaching this is first you select the satellite, then you select the channel - whether digital or analogue - from the menu." Bottom line - separate memories for the same satellite introduce unwanted problems.

15) "The search:" It has been around for two years; the ability to define a lower and upper frequency (such as 950 and 1450), perhaps define a polarity and the receiver goes into an extensive signal by signal search and logging routine. Cratt: "Yes, there is DVB2000, DVBedit and others available but these are after-market products almost intended for hobbyist only use." Comments agreed, said "we really don't care if it takes 30 minutes to go through a full satellite - but we DO want this feature."

16) Memory search update: When you have a transponder in memory, and you wish to check for changes in programming within the MCPC - software that will go back through and compare the programme channels found against those already in memory. And *not* create a *new* memory file - the existing one should be updated to the new data by *overwriting*. Helpful as well; if in this software function a "date and time stamp" could be added to memory so user can determine *when* a particular transponder was *last* updated.

The Nokia Challenge

Many of the software "wish list" suggestions are in fact available for various European models of the Nokia receiver. But Nokia's nearest office to the Pacific is in Hong Kong (from which they deal with Taiwanese OEMs who actually manufacture many of their circuits) and keep an eye on the growing mainland Chinese marketplace.

Cratt. "Nokia is not interested in the free to air market and therefore we should not be interested in them. There is an irony that Nokia engineers have created the most sought after receiver in the world, but it has taken software people who don't work for Nokia to figure out just how useful this receiver really is. The reality is that the Pacific has too small a population base to interest them and by their lack of activity here, they have opened up the marketplace for dozens of other firms."

A campaign to 'bring back' linear power supplies???

An emotional issue. There is no such thing as a perfect (as in design-fault-free) SMPS (switch mode power supply). The SMPS is actually a radio *transmitter* with components operating under 'heavy stress" (near the limit of their ratings). What makes SMPSs cheap (their primary attraction) is what makes them unreliable and noisy (generators of radio frequency interference). Components used in SMPSs have a limited life expectancy and the design has spawned an entirely new family of cheap parts. Electrolytic capacitors, for example, custom designed for SMPS duty have a known (and short) life cycle interdependent upon ripple frequency and heat. An electrolytic moved by a circuit designer closer to a hot IC gets hotter than it should, resulting in poorer operating conditions and an even shorter life expectancy. Reducing the SMPS operating frequency reduces the 'stress' on components but the trade off is a heavier (duty) transformer which costs more money. So raising the operating frequency (thereby increasing the interference levels) means cheaper parts, less cost for them. Better shielding and filtering to reduce interference? SMPS designers argue they presently "meet stringent emission standards" but this overlooks that higher operating frequencies generate more RFI (radio frequency interference) that radiates over longer and longer distances.

18) Teletext: Simply software - no logical reason why every IRD should not have teletext capability included.

19) Signal strength: At bottom end, there is no on screen presentation of received signal level (or quality). At top end there is BER indication. In between, a bar that shows relative signal level (strength) and/or quality (bit error rate). Or a C/N (carrier to noise) number on screen. Cratt: "If UEC's 660 can show BER, there is no reason why other's can't do the same thing."

20) BER/signal strength to dish: Dish tweaking involves being at the dish whereas most IRDs are inside the house. How about a system that loops a tone from the receiver back out to an inline (installer) box at the dish with a rising tone (frequency) as the dish is peaked out?

21) Auto peaking: Possibly not for all receivers, but Palcom's 7700 (and some Drake models) equipped with motor drives did automatic signal level analysis and fed back those results to the positioner creating an "automatic dish peaking" system. Cratt: "Any IRD designer that wants to perfect this for digital signals can contact me - I still have some Palcom 7700s in stock!"

22) RF, SCART or RCA? Twin, even triple SCARTs are now available on some IRDs. As widespread and common as SCART is in Europe, it remains an oddity in the Pacific. Suggestions: Twin RCA video, two sets of RCA audio, S-VHS video.

23) Dual inputs: Many consumers now have two separate dishes, one for C, another for Ku. Yet digital receivers - unlike their analogue counterparts - largely offer only a single input (or looped input). An "A" and "B" input with at least one of those looped seems like the way to go. Yes, you could use an external 0/12V switch. Not desirable.

24) CI mode channel changing: "Far too slow" suggested Philip Ingegneri of Kristal Electronics. "We obviously need faster processing speeds, more capable processors" said Cratt.

25) Abort system: Suppose you are selecting a channel, change your mind. Suppose you are in the middle of a frustrating menu set-up and change your mind. Exit? Stop? An "abort and return to last completed routine position" button. Or, as with your Windows PC software - "undo last action."

26) Reboot IRD: "The customer calls up and you quickly decide the IRD has 'crashed.' What you want to tell them is, 'Look - the IRD has the equivalent of one or more Pentium processors inside. Sometimes it gets confused and needs to start over again from the beginning. Pull the mains plug, wait 30 seconds and then restart it.' How about a 'reboot' button on the rear (some suggested on the remote control). If we had the mains power on/off switch (#2 in this list), that would help. Almost anything is better than forcing the customer to get down on his hands and knees to trace the IRD power cord, locate it in the socket, pulling it out and waiting 30 seconds to plug it back in!"

27) External replaceable fuse: "Not a good idea" came the attendee response. "Half will shove in a 20 amp fuse, most of the rest will try to stick a nail in there!" OK - a circuit breaker? Cratt: "Great. We have just crossed the threshold of pain for IRD cost."

28) Major changes between models: "This is not exactly a design suggestion" began Cratt, "but when suppliers like UEC come out with totally new models (the 700) before they have fully solved the problems with their older models (642, 660 power supplies), that leaves us in the front line wondering whether manufacturers have total disregard for the market. Audience reaction: "Why can't we have receivers that get better and better with each new version, rather than having newer problems with no resolution of the existing problems?"

29) Instruction manuals: A heated debate that began with the suggestion that 4 digital menu entry numbers be eliminated, hidden, or withheld from consumers. Cratt: "The manuals are hopeless, shocking." Creating a comprehensive, understandable instruction manual is an art. From the first Panasat 520s out of South Africa, they have been written in a strange mixture of installation and operator/user language. The real problem is there should be *two* manuals. "The installation portion should be totally separate from the user" was a comment. "The user portion should only deal with operating the receiver after the installation has been completed. When you mix the two activities, you have a muddle which hopelessly confuses the consumer. They don't know the downside of getting sideways with the installation procedure and having the damn thing lock up on you." And the four digit menu entry code should only appear in the installation manual? "Correct. That way as an installer you can be selective about who is left with the installation procedure, and you don't have people who can't programme their toaster fearlessly entering four digit numbers and turning everything upside down." And the user manual? "It begins with the assumption the receiver has been fully programmed and maybe - *perhaps* at the end in an 'Advanced User' portion that is clearly labelled, you give instruction for adding new transponders and services. But unfortunately, to do this you need to disclose the code and once it is in print, everyone who has the manual assumes it is a piece of cake to do."

Now - check out the form on page 34.

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Common Interface Standard (CI)	NA	•	NA
Dual CAM Sockets (PCMIA)	NA	•	NA
Dual input Analog Receiver (low Threshold)	NA	NA	•
On board Dish Positioner (Medium Duty)	NA	NA	•
Motorized Feed horn Support (Polorotor)	NA	NA	•
32 Step Threshold Extention-Analog	NA	NA	•
Auto Audio Carrier Search-Analog	NA	NA	•
Auto Channel Search-Analog	NA	NA	•
Asia/Pacific Digital / Analog Channels Pre-Programmed	•	•	•
FTA Power Vu Reception	•	•	•
TP/Sat table can be copied to another - via serial port	•	•	•
MCPC / SCPC Operation	•	•	•
C / Ku / S Band Reception	•	•	•
Auto PID Detection and manual PID entry	•	•	•
Universal LNB Support	•	•	•
DiSeqC / 22KHz / 0-12 volt LNB switching modes	•	•	•
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BENJAMIN'S DB 6600CI is an appealing box

Each of us hopes that the "next" digital IRD will be "*the one*"; the receiver that answers all of our problems, does everything we want, with no persistent or annoying artefacts or operational problems.

Benjamin hope you will accept their Taiwan built DB 6600CI as "*the one*." For some it will be; for others, the quest continues.

The last time we spoke of a Benjamin digital IRD, it was not very reassuring. Their DB 5000 FTA receiver (p. 10, #43 in March 1998) came to SPRSCS '98 in the hands of hopeful NZ distributor Telsat. Before we could get it programmed for group test, it blew up the power supply. We reported, "*another time, another place.*"

The Benjamin of 2000 is significantly improved from the Benjamin of 1998. First, the (SMPS) power supply works. No better, no worse than others - but it works every time for as long as we had it to test. And speaking of SMPS - as we do on pages 6 - 8 here, we thought it appropriate to measure the amount of "hash" coming out of the rear panel RF OUT socket. That's the one where the inboard UHF modulator and the FTA off-air terrestrial signals are combined for delivery to the TV set(s). Using a spec an, we found 42 dBuV of "hash" at 45.25 MHz (NZ channel 1), 40 dBuV at 46.25 MHz (Australian channel 0) falling to 37 dBuV at 55.25/57.25 MHz (NZ2 and Australian 1) and further falling to 36 dBuV at 62.25/64.25 MHz (NZ3, Australian 2). Translation? If the FTA terrestrial signals on any of these channels are below approximately 70 dBuV, you *will* notice SMPS interference within these lower band I channels. Is that bad? Lacking a direct comparison with other switch mode powered IRDs, we can't say. But we note this warning - from this point onwards, all IRDs submitted for test will have their band I hash measured and we'll have a comparison report of units currently on hand for a future issue.

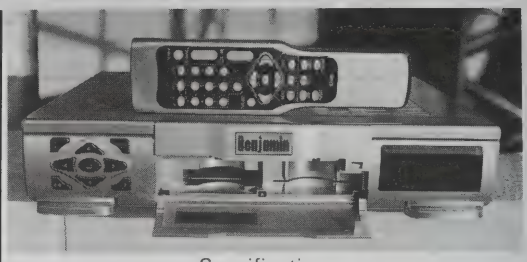
The primary reason why someone would want this receiver, as we see it, is as follows:

1) You want the latest, newest just because it is the latest, newest;

2) You want the agility of an IRD that does free to air (FTA) analogue + digital, and you want the ability (new Australian legislation aside - see p. 1 here) to switch between a smart card service and FTA.

This is a well appointed, handsome receiver light grey in colour with a remote that 'feels' slightly unusual in the hand. As the specification table (right) suggests, most everything you might wish is included.

But not everything. Teletext, for example, works with a TT equipped TV receiver but not with a non TT receiver. The model we received for test had no embedded CI installed (it is optional). This is really a "three slot" receiver - slots "A" and "B" require an externally supplied CAM (such as Irdeto or Viaccess) while unmarked slot "C" is supposed to directly accept a smart card with no externally installed CAM - provided the "embedded" hardware was factory installed.



Specifications

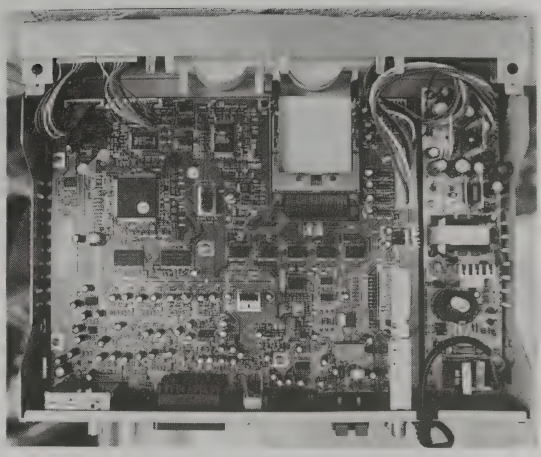
- **LNB/Tuner input**: 950-2150 MHz, over levels of -25 to -65 dBm
- **LNB voltages/control**: 14V Vt, 18V Hz at 400 mA max; 1 input, 1 loop "F"; 22kHz, DiSEqC (v) 1.0
- **Demodulator waveform**: QPSK . 2-45 Msps symbol rate, with "fully DVB-CI compliant" decoding
- **Video parameters**: MPEG-2 main profile, data rates to 15 Mbits/s, PAL displays as 720 pixels by 576 lines and NTSC as 720 pixels at 480 lines; standard 4:3 aspect ratio, 16:9 selectable
- **Audio parameters**: MPEG-2 layers I & II (Musicam audio); stereo, audio-left and audio-right
- **Application resources**: 2 Mbyte RAM memory, 1 Mbyte flash memory
- **RF output**: UHF modulator selectable over PAL G (audio +5.5), I (audio +5.996), K (audio +6.5) and NTSC-M (audio +4.5) programmable from European ch 21 (471.25) to European ch 69 (855.25) - factory default is 607.25 MHz (Australian 39 is 604.25, 40 is 611.25 while NZ 38 is 607.25)
- **Polariser control**: 3-way push terminal with standard +5V, pulse, ground and skew pulses of 0.8 to 2.2ms (standard stuff)
- **Connectors/slots**: "F" input, F "loop" for second receiver at L-band (defined above) with LNB voltage(s), tone or DiSEqC carried to LNB through downline; RCA video and 2 RCA audio sockets; SCART for TV set plus for VCR or separate (analogue) decoder; 3 way polariser push terminals; 9-pin D-sub RS232 connector; 0/12V push terminal connector; two PCMCIA (user supplied CAMs) and one embedded CA slot for smart card (optional)
- **Receiver front panel displays**: Standby mode LED, signal lock LED, 4 digit LED channel display.
- **Handy remote buttons**: EPG selection, programme (INFO), MUTE, TV/RADIO (menu selection), UHF (displays modulator channel on screen), PAUSE (freezes frame), TEXT (requires teletext compatible TV); AUX (switching to external sources through SCART)
- **AC mains** 90-260V, 47-63 hertz, 30 watts

DB 6600CI has memory capacity for 63 different satellites (or combinations of C + Ku totalling 63 equivalent birds). Like most European destination boxes, it comes out of the shipping carton pre-programmed for satellites you will never see and probably never heard about. The good news is there is a software routine allowing you to edit, delete or "rename" a satellite or individual transponders.

Ming Leu and Joe Ara of Benjamin distributor Autosat described the DB 6600CI to us at SPRSCS 2000 as "*versatile*." Participants in the conference session dealing with IRD designs (p. 6, here) might have had a different view - if the Benjamin had been singled out for specific discussion (it was not). You start with a "Main Menu" and learn there are really 9 "Main Menus." They include (1) Channel edit, (2) EPG, (3) Timer, (4) Installation, (5) Common Interface, (6) Option[s], (7) Parental Lock, (8) Factory Default and (9) Receiver Information. Most of us head to (4) Installation first. Surprise. You get there without entering a 4 digit number, simply select the appropriate line with the down arrow key and then snap OK.

First order of business - decide what type of switching you wish for the first satellite. The choices are mind boggling, a direct reflection of what we perceive to be the chaos created in Europe when everyone operating a satellite went their own separate way to create their own proprietary "standard." The DB 6600CI can support (1) DiSEQc (version 1.0), (2) 22 KHz, (3) 0/12V, and now the fun begins, (4) 14-18V + 22 KHz, (5) 0/12V + 14-18V, (6) 0/12V + 22 KHz, (7) 0/12V + DiSEQc and the nightmare of them all, (8) 0/12V + 14-18V + DiSEQc. There is one other choice - no switching voltage or tones at all.

At this point you may discover you need to define the type of LNB(f) you are using. Benjamin calls the following "normal": (1) C-band with 5.150 LO, (2) Ku low with 9.750 and 10.000 LO, (3) Ku high lodged in LNB frequency 2 as 10.750 and 11.300, (4) Wide band Ku (low + high) with 9.750 in LNB frequency 1 and 10.750 recorded in LNB frequency 2, (5) Universal (low + high) with 9.750 in LNB frequency 1 while 10.600 is in LNB frequency 2. Fortunately, if you can live with these "normal" settings - and you most probably can - you avoid having to laboriously enter all of these numbers in the proper place by simply selecting "Normal Operation Mode." And in the event you have different LNB local oscillators or some other special situation, you select a sub menu titled "LNB Set-up" to enter the correct (for you) numbers. Thankfully, you should only have to do this once - with each IRD but for each satellite to retain in memory you will have to confirm the correct settings.



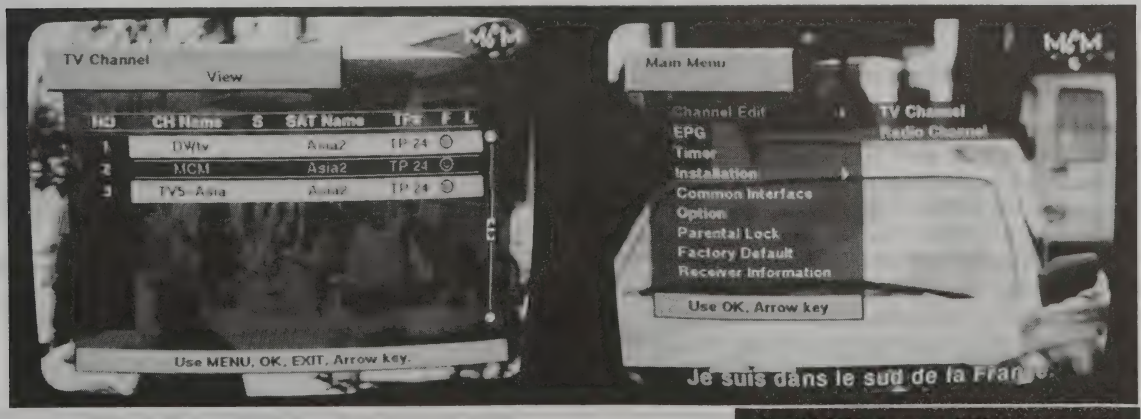
Chucker-block full. First we combine all of the functions into a single monster chip, and then along come new functions requiring their own discrete new-age chips. It is a never ending game.

Now that you have the correct LNB parameters in memory, and have sorted through the switching options, time to play. Well, almost.

From the "Installation Menu" you can do an ("auto") satellite search or you can select a satellite and do a "Transponder set-up." The key here is to first get to the correct satellite memory position. Hotbird, Nile and Turk 1C are obviously not on your horizon. None in this example will apply to you in Darwin or Adelaide. But buried in the list are some familiar names; As2 (AsiaSat 2) for example.

Like most receiver manufacturers, there is a factory entered set of programmer parameters. We selected As2 to load and from some master list they rely upon, we loaded 57 TV programming services in just over 4 minutes time plus an additional 19 radio. This receiver *can* be confused by

FRESH out of the box, DB 6600CI displayed a portion of AsiaSat 2 bouquet (left), found balance when asked to scan full As2 satellite from factory loaded memory. "Main" menu is actually optional set of nine which takes you to sub-menus as well as sub-sub menus.



programme software; WorldNet for example ended up listing 20 times of which only *one* is the single video channel (3764Hz, Sr 6.100, 3/4). But most receivers (this one included) find and memorise that single video channel plus each of the 19 radio/audio service/data channels which complete the complex bouquet. The 6600CI also has some difficulty with the various Chinese SCPC channels; the video is perfect, but Fujian TV (one example) loads 3 times. Once with TV programme audio, once with a radio station on the opposite audio channel + the video picture, and a third time with the TV audio on the left channel and the radio on the right - calling it stereo. It is not of course.

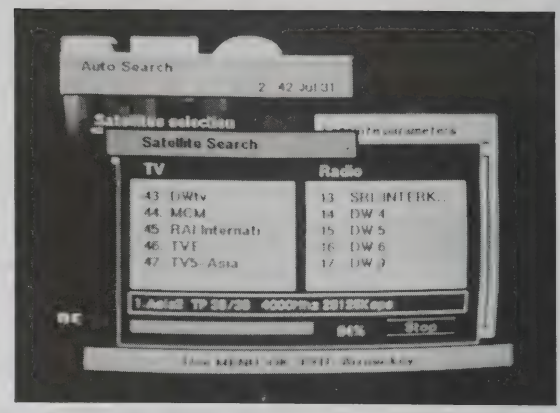
During a month when PAS-8's California Bouquet has been giving many receivers fits, the DB 6600CI when asked to load the factory memorised PAS-8 channels did it with speed and accuracy (17 seconds for 47 services - why it was so much faster here than on As2 we cannot say). Many (most) of the PAS-8 C-band services are CA, PowerVu at that, so finding and identifying them is an academic exercise since you will never watch any of these anyhow. What we did find was EWTN, EB Net, ad-hoc as FTA services loaded and worked with brilliant video quality. Now, about the audio.

We saw an IRD at SPRSCS which had badly distorted audio; something termed 'THD' for total harmonic distortion. This particular IRD produced very garbled (muddy, bass emphasis) sound and anything exceeding approximately 25% volume out of the IRD was not listenable. The IRD was usable only when you ran the baseband audio out through an external amplifier, or, used the RF modulated output. The DB 6600CI has not such problems but it does have a quirk. At least the one we had for test did. On some services (DW in European Bouquet, some of the Chinese SCPC) the "Ssss" crackled. It is called symbylance and it means there may be something in the audio processing with some data streams which over amplifies the higher audio tones. Not distorted, not annoying, but there. And more important - only there on a handful of the more than 100 programme services we loaded.

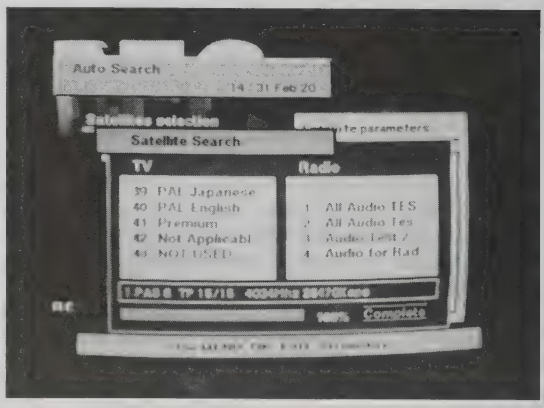
Speaking of loading. If you stick to the preloaded satellites and in-memory transponders, it is quick and accurate. The only downside we found was the time it took to load As2 (and there *is* much there to get through) and after loading, not every Chinese SCPC that loaded would play. The DB 6600CI has an attractive display that pops up along the bottom of the screen after each programme channel selection telling you for a few seconds the Channel number, the TransPonder number, the status of stereo audio and the number of audio channels found. It even gives you a yellow "happy face" indicating all is well. Only it gives you the same happy face even when all is not well (such as the Chinese SCPCs that loaded but would not play - 3 out of 20 or so).

Scrambled services show a bright red "S" in the lower display and then in a few seconds at top left of screen it reinforces that with white letters on a black screen that says SCRAMBLED!. Even this system is not beyond being fooled. For example, on PAS-8 NHK, we got the red "S" insignia on most of the Japanese service channels, even those that were not SCRAMBLED!. None of this is terribly annoying - it merely indicates the software here is evolving.

The CI/CA portion. You need a CAM just as you do with the Hyundai 800CI - one that plugs into either slot "A" or "B" and then you slide the authorised card into the CAM. We were unable to check this portion out, but did see it operating on



While As2 search took approximately 4 minutes (above), PAS-8 search took but seconds (below). Both searches did repeat listings for first found services again at end as "last found." Not sure why.



Aurora during SPRSCS 2000 in Melbourne to our satisfaction. TVSN and the Austar "demo channel" work fine as FTA.

The instruction manual. Unfortunately, it is almost precisely the kind of "mixed purpose" set of instructions that drew so much critical discussion during the IRD design session at this year's conference. It is complete enough, but unfortunately drifts back and forth between installation procedures and operational instructions. Pity the poor consumer who is faced with sorting out which portion applies to them after the competent installer has done his or her thing. Benjamin would do well to engage the services of a professional Tech Writer to create two totally separate manuals, each for the intended level of user eliminating the "does not apply" installation material from the consumer/user version.

Overall, it works very well, has state-of-the-art sensitivity, does not run particularly hot (or even warm) and for the consumer it should be a friendly machine. The menus are complex, too complex for the average person, and perhaps in a later version this will be improved. Oh yes - they get extra marks for eliminating the 4-digit set-up code!

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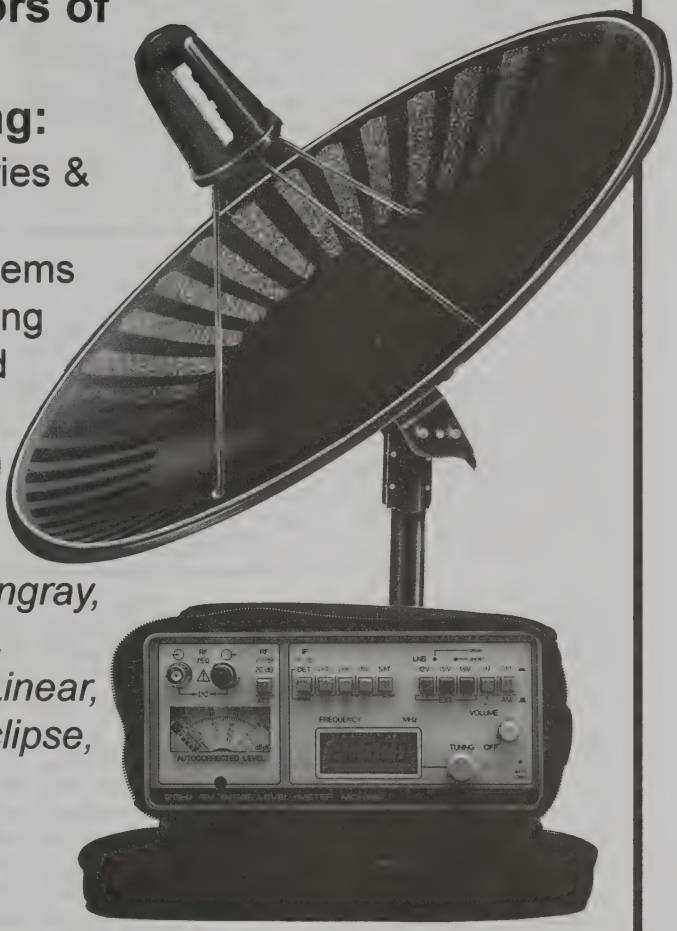

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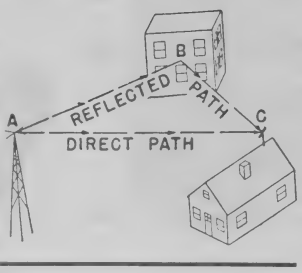
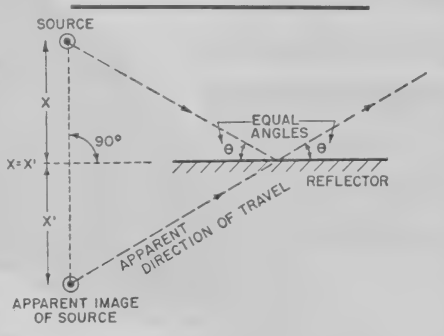
VHF and UHF signals seldom travel in a straight, unobstructed line from the transmitter to the intended receivers. Even when "line of sight" exists (the receive antenna can "see" the transmitting antenna), there are interim reflections from the ground which will arrive at the receiving antenna either slightly or significantly delayed in time from the "free air" path. When two or more signals, not travelling the same path, arrive at the receiving antenna, one is always the "fastest" (because it travels a shorter distance) and another (or others) are always slightly delayed in time because they have travelled further.





If, for example, the longer path is a simple one half wavelength greater (less than 3 metres at 45 or 46 MHz, less than 0.25 metres at band V), the "slower" longer path) signal arrives at the receiving antenna 180 degrees "out of phase" (delayed by a half wavelength - whereas a full wavelength would be 360 degrees). If both signals are of exactly equal in strength, and one is 180 degrees out of phase with the other, the net effect is no signal at all; one simply "cancels" the other.

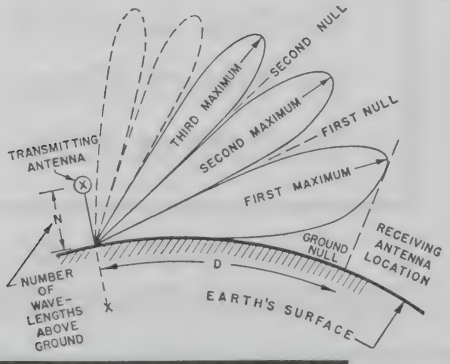
Reflections, signals arriving delayed, are a major concern for all VHF and UHF reception. One of the primary tasks for the receiving antenna is to isolate the reflected path signals from arriving at the antenna's "active" or "connected" segment. This is done by building into the receiving antenna a "searchlight" type of focusing which can be directed so that reflections are reduced or eliminated. If the receiving antenna has a sufficiently "sharp" beamwidth - the cone shaped area representing a limited direction from which the antenna will receive signals effectively - then reflections can be eliminated simply because they arrive at the (transmission line) connected element from a direction outside of the cone coverage pattern.

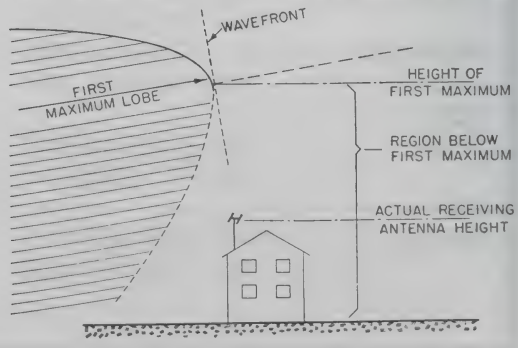
The reflected (longer path) signal or signals can be identified by their arrival angle (middle diagram) and this in turn assists in selecting an antenna that does not favour signals arriving from these angles.

Because VHF and UHF signals essentially follow "line of sight" optic laws, it follows that for maximum coverage to the most distant points, the transmitting antenna is situated on an elevated site. The higher the transmitting antenna above "average terrain" (abbreviated haat), the greater the "line of sight" distant horizon. If the transmitting antenna is 300 metres above average terrain, the maximum line of sight distance is approximately 72 km while a transmitting antenna 600 metres haat would have a "line of sight" range of 100 km. "Line of sight" in our VHF - UHF application does not mean how far you can "see" but rather how far the VHF or UHF signal will travel from an elevated site of a specified height. In this case, the VHF - UHF signal travels approximately 1/3rd further than you could actually "see" if you were at the top of the transmitting antenna (you could see 54 km from 300 metres, 75 km from 600 metres).

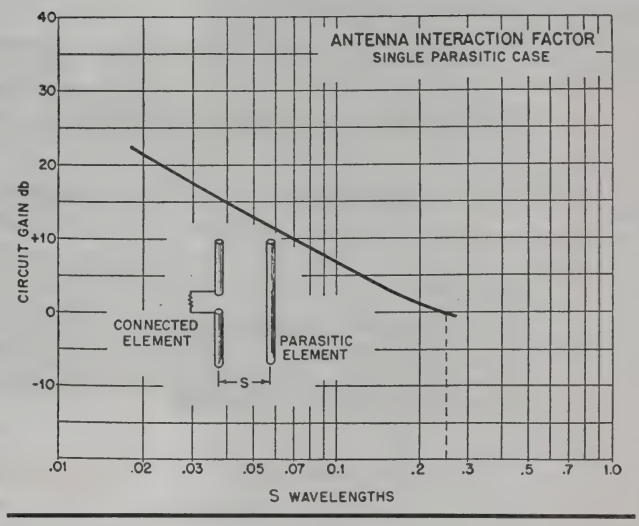
However, this coverage assumes many factors which are seldom true in the real world. For example, placing a transmitting antenna 300 or 600 metres haat situates it "above" the intended receivers; so much so that it is similar to standing close to a powerful searchlight that is passing right over your head. You are out of the beam, and not illuminated even though it is close by.

In the two drawings below, you can see that transmitting antennas have "patterns" of their own, with maximum signal and nulls interspersed. A receiving antenna even close to the transmitter may have to be raised significantly above ground to reach the first or lowest wavefront (right hand, below).





As was pointed out in SF#71, the directivity pattern of a basic "dipole" antenna is modified when additional elements of a precise length and separated from the "connected" (dipole) element by a precise distance are added. These not-connected elements are called "parasitic" because they "feed off of" the dipole and act to reshape the dipole's basic reception pattern.

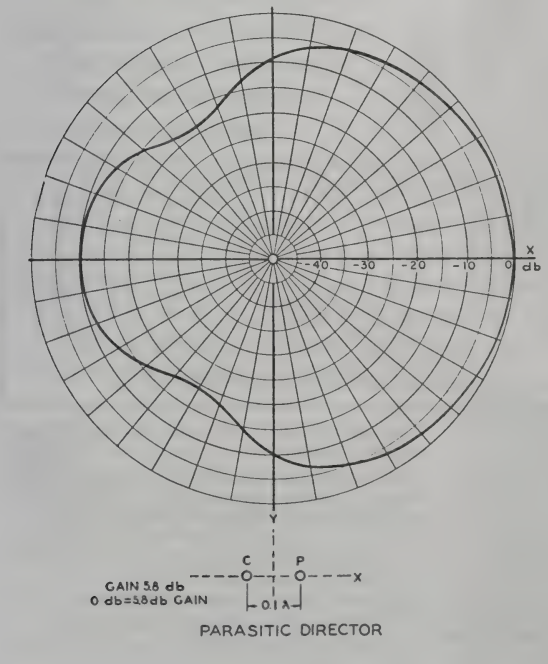


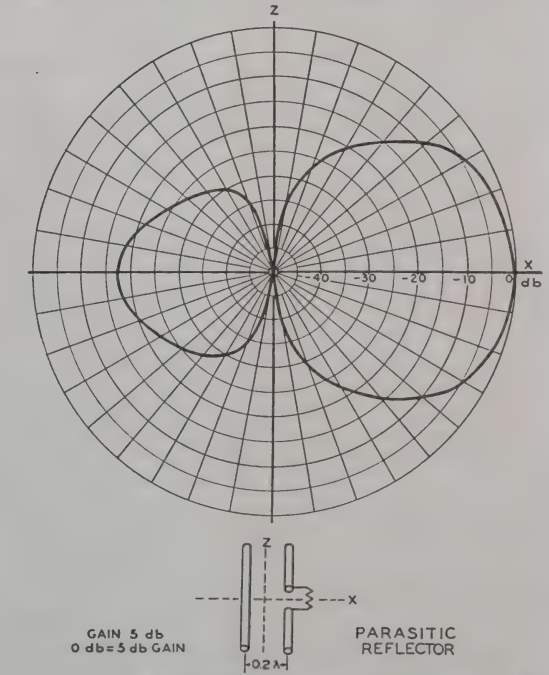
The length of the parasitic element(s) and the placement of the element(s) determines the new cone shaped pattern of the modified antenna. Parasitic elements can, by design, be shorter than the dipole (and these are called directors) or they may be longer (called reflectors). "Directors" focus (send) energy to the dipole by narrowing the cone shaped pattern as it points towards the (distant) transmitter. Reflectors, by being longer than the frequency dependent length of the dipole, act as a "shield" blocking the arrival of stray signals that might come to the dipole from the "rear" of the antenna (the dipole 'side' pointing away from the intended transmitting station).

Any parasitic element, if of the correct length, will enhance the "gain" of the basic dipole. But the amount of increased gain is a function of the "coupling" (interaction) between the dipole and the parastic(s). In the top table, the left hand vertical edge represents "circuit" (signal) gain while the bottom line represents the distance ("S") between the dipole (connected element) and the parasitic. Note that a parasitic placed 0.02 wavelengths from the dipole can add 20 dB of gain to the dipole! How much is 20 dB? Well, the difference between a 30cm and a 5.8m dish at Ku band, or a 90cm dish a and an 8m dish at C-band. Yes, that is a whopping gain advantage. Now the bad news. 0.02 wavelength at 45/46 MHz (NZ channel 1, Australian channel 0) is 0.01325 metres. That is a spacing "S" of 0.13 metres (5.21 inches). Now try the same calculation for 600 MHz. The answer is 0.01 metres (0.393 inches). It is a bit tricky to get two pieces of 1/2 inch tubing as close together as 0.393 inches for a 600 MHz antenna! What this says is that while you might make this work at 45 MHz, it would never be practical at 600 MHz. And there are other considerations beyond the physical space available, such as "loading" of the dipole with nearby metallic objects.

When "loading" is considered, the nearest practical distance "S" is around 0.1 wavelength, 26" at 45 MHz, 1.97" at 600 MHz. As the graph above shows, with 0.1 wavelength "S" (spacing), the gain of a two element antenna (connected element + one parasitic) is around 6 dB.

Placing a parasitic director 0.1 wavelength ("S") from the connected element produces the 5.8 dB gain pattern shown below (left). Making the parasitic element a reflector and placing it 0.2 wavelength ("S") creates the 5.0 dB gain pattern shown below (right). Can you not improve this by placing both





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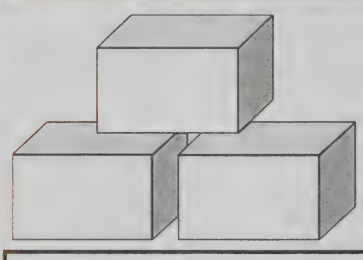

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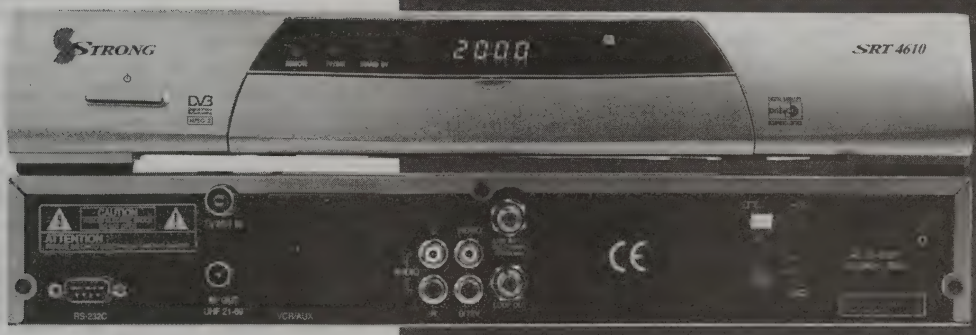

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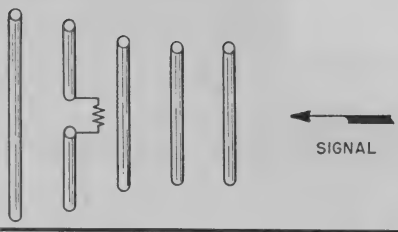
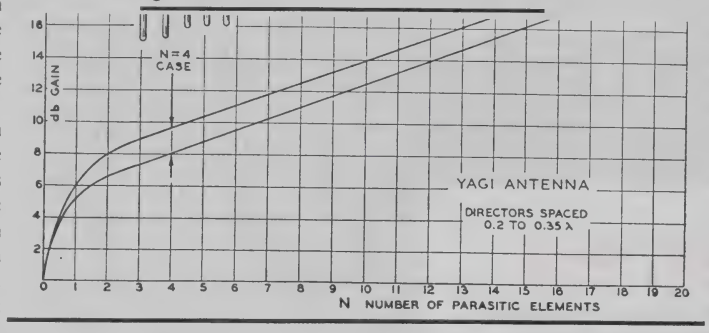
a director and a reflector either side of the connected (dipole) element?

A dipole plus two or more parasitic elements is known as a "Yagi-Uda" design antenna. These Japanese antenna designers from the 1930s first devised a method of improving the gain and reception pattern of the basic "dipole" antenna. In time, Dr. Uda's name was dropped and the antenna was simply the "yagi."



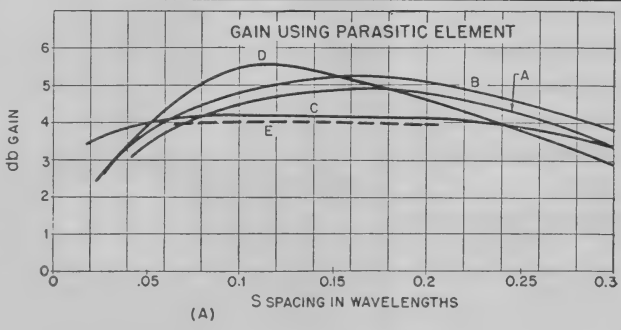


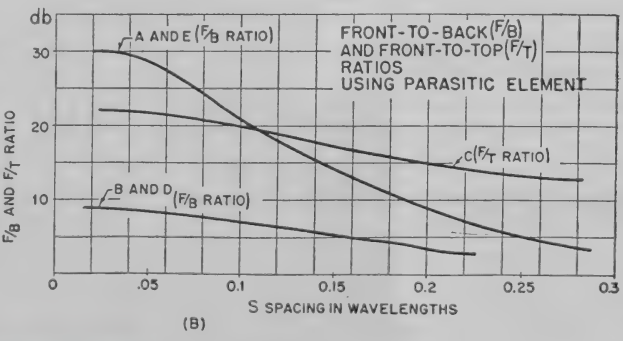
"Loading" between elements - the interaction that occurs when multiple parasitic elements are placed in and about a dipole, is a very complex subject. In theory, if you continue to add parasitic directors, the gain of the antenna increases and increases and increases. But two operational characteristics of the antenna change which create new problems.

Note in the diagram/graph above, a 5 element yagi (the dipole + 4 parasitic elements where "N = 4" meaning the number of parasitics is 4) will produce between 8 and 9.7 dB of gain. That means "more gain than the dipole alone will produce" (which is always assumed to be "0 dB of gain"). With N = 4, we have an antenna more than 250% larger than a dipole alone. Physical size is a consideration - at 45/46 MHz, the boom to support the N = 4 antenna would be 5.64 metres in length (nearly 18.5 feet). Imagine trying to "hang" this size antenna 10 metres in the air above a house! Of course at 600 MHz, the antenna scales down nicely to 0.43 metres (16.7 inches). That is why you see multi-multi parasitic antennas for bands IV and V - they are still manageable in physical size.

Alas, there are more serious problems. Each parasitic element reduces (lowers) the "impedance" of the connected (dipole) element. What begins as a 75 ohm antenna (a dipole with twin quarter wave sections joined in the middle through a 75 ohm line) quickly becomes a 20 ohm antenna when N = 4. As you continue to add more parasitic elements, the "feed impedance" of the connected element drops lower and lower. And this makes the antenna more and more difficult to "match" to any reasonable kind of transmission line (or to the receiver at the end of the line). At the same time the impedance is dropping, the "bandwidth" of the antenna is becoming smaller and smaller. A dipole all by itself at 45/46 MHz has to be able to function over a frequency range of 5.5 MHz to recover properly the full TV channel bandwidth in a PAL system. This amounts to trying to make the dipole function equally well over a bandwidth equal to 12% of the operating frequency. Now, add one parasitic element to that dipole, and the bandwidth of the antenna drops by 50%. With an N = 4 antenna at 45/46 MHz, the signal recovery bandwidth has fallen to under 2 MHz yet it has to be at least 5.5 MHz wide to properly intercept the video carrier (45.25 or 46.25) as well as the aural carrier at 50.75 or 51.75. In fact, it cannot be done with a single dipole plus 4 parasitic elements at 45/46 MHz. If the antenna is designed for maximum gain at the video carrier frequency (45.25 or 46.25), the antenna's gain at the aural carrier frequency (50.75 or 51.75) will drop to a minus number, less than even a dipole all by itself.

In the twin graphs below, we see just a few of the challenges that antenna designers face. In the top chart, curve "A" is what happens to gain when a reflector parasitic is placed at various "S" distances from the dipole to achieve the maximum front to back ratio. Curve "B" is gain variation as the reflector is spaced for maximum forward gain. "C" is a special case when you want equal gain from two opposite directions. "D" is maximum gain when the parasitic is a director and "E" is for maximum front to back ratio using only a director as a parasitic.




db
A AND E (F/B RATIO)
FRONT-TO-BACK (F/B) AND FRONT-TO-TOP (F/T) RATIOS USING PARASITIC ELEMENT
C (F/T RATIO)
B AND D (F/B RATIO)
F/B AND F/T RATIO
S SPACING IN WAVELENGTHS
(B)

The answer here is that interaction between elements gores in both directions - from and to the dipole, from and to the reflector, and even between the directors. And this is for a single channel design antenna only! As you might imagine, creating peak performance on several channels at once is tough.

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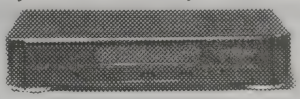

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$199 **Cat # S 1101**

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Fully featured digital receiver has inbuilt dish pointing calculator, signal strength monitor, transponder editing, SVHS, UHF and composite video outputs, selectable and secondary audio network, Manual PID entry,1-45Msym capability for FTA broadcasts $799 **Cat # R3100**

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A trade association for users, designers, installers, sellers of private satellite-direct systems in the Pacific Ocean & Asia Regions

Ethnic intrigue in Auckland

"*My name is Steven Norman*" said the man handing over his business card (further identifying his firm as City of Sales Investigation [NZ] Ltd). "*I have a few questions about your satellite dish.*"

And so began a saga for several dozen residents of the south Auckland (NZ) communities of Howick, Pakuranga and still others in Manukau City.

"Was your dish installed according to City bylaws? Was it installed by a certified installer? How many channels are you receiving? Do you pay any fees for your satellite reception and if yes, whom do you pay? Where did you get this equipment, how did you learn about it, how much did it cost?"

Investigator Norman is a mystery. Who hired this man, who created the questions he asks, what is his purpose in gathering this information? He told one dish owner, "*Within five hours I have spotted around 18 dishes in Howick.*"

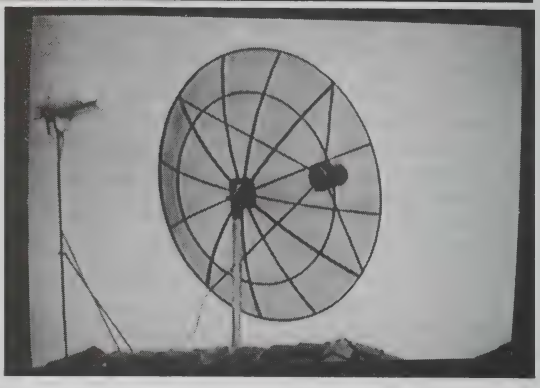
An article appearing in Auckland area ethnic newspaper "Indian Link" for June includes these statements:

"Home viewers currently enjoying ZeeTV programmes from the Indian subcontinent may find their prime source of entertainment curtailed in the near future. A company selling satellite dishes to unsuspecting people is failing to advise consumers that Zee TV programmes may soon be switched off."

Indeed they were (June 28). But it turns out that the majority (75% or more) of the dish homes identified in Howick, Pakuranga and Manukau City are inhabited by Chinese (émigrés), not Indians. Investigator Steven Norman told one dish owner, "While I cannot tell you who is paying my bills, there is a company in Pakuranga called 'Pacific Technology' who are selling dish systems primarily to Chinese. My employer is interested only in these activities."

The Auckland region, including the many suburbs, has adopted rules governing the size, height and location of satellite dishes. Potentially, those installing dishes must pass two tests:

1) A "Resource Consent" which establishes the dish will violate no zoning rules and has the permission of neighbours;



Auckland installer: "Once you get your head around the city rules, you discover the safest legal place is on top of the building, as far from the north side boundary as possible for best As2 reception." This dish in Ellerslie is rooftop mounted. (L. Mathews)

2) A 'Building Permit' because local rules designate a satellite dish as a 'new structure'.

Rule 7.8.2.1 in the Manukau (Proposed) District Plan defines "network utility installations" in the same paragraph as "satellite dishes" and decides these are 'Controlled Activities' requiring a Resource Consent. A 'Notified Basis Application' requires publication in a local newspaper while a non-notified does not. The least expensive, non-notified, attracts a $500 + GST fee just to submit the application. No, no guarantee of approval, no - you don't get the money back if it fails.

And Steven Norman. Not satisfied with questioning people to learn all he could about their satellite dish and its use, Norman then *voluntarily* turned his files over to Manukau City. The Howick & Pakuranga Times front paged a story on July 27 that begins with:

" A MYSTERY sneak is paying a private investigator to dob in Howick and Pakuranga residents who don't have resource or building consents for their TV satellite dishes."

MEMBERSHIP IN SPACE

Membership in SPACE Pacific is open to any individual or firm involved in the "satellite-direct" world in the Pacific and Asia regions. There are four levels of membership covering "Individuals," the "Installer/Dealer," the "Cable/SMATV Operator," and the "Importer/Distributor/Programmer." All levels receive periodic programme and equipment access updates from SPACE, significant discounts on goods and services from many member firms, and major discounts while attending the annual SPRCS (industry trade show) each year (Melbourne September 2001). Members also participate in policy creation forums, have correspondence training courses available and their support makes possible the TV show SPACE Pacific Report. To find out more, contact (fax) 64-9-406-1083 or use information request card, page 34, this issue of SatFACTS. Page space within SatFACTS is donated each month to the trade association without cost by the publisher.

Norman's reports have forced the City to do its own investigation. Said Glenn Teal of the Manukau City offices, "The first thing we knew about this was when we received a letter from City of Sails which included a list of Howick and Pakuranga properties containing satellite dishes. The council is obliged by legislation to act when informed of the presence of structures which do not comply with the District Plan or building acts. The letter requested council to take action *against* these residents."

So *who* is paying private investigator Norman? *Who* would benefit by forcing the (largely) Chinese émigrés to give up their C-band dishes?

Coincidental with the investigation, something called World TV began delivering four Chinese (+ NHK, Arirang) TV services through the Sky Network (NZ) Optus B1 bouquet. C-band reception (now up to 22 channels) is FTA. World TV gets NZ$50.00 plus for their package of four.

Simon Roche, of The Howick & Pakuranga Times, asked World TV's George Lin whether his firm was responsible for the investigation and dobbing in of C-band users. He claimed no knowledge of City of Sails, Norman or an investigation. A spokesperson for Sky, asked the same question, simply said, "*Our dishes* do not require a Resource Consent."

As SF goes to press, "Inspection Notices" signed by Karen Page (District Plan Enforcement) are arriving at homes across the area. Bounty-hunter Norman is apparently getting paid for collecting satellite dish scalps and in the process is oblivious to whether they are from homes that speak Cantonese, Mandarin, Russian or Thai. There are some civil issues here as well - including regulations that have the effect of banning people from practising the religion of their choice or tuning in out of country telecasts. Welcome to the 21st century - rule by edict.

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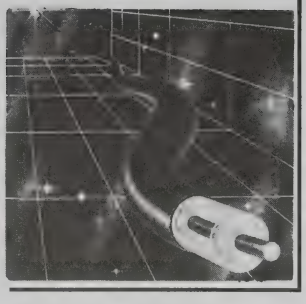
The CABLE Connection



loss per 100m	50 MHz	230 MHz	650 MHz
RG-59	6.4 dB	12.9 dB	22.4 dB
RG-6	4.9 dB	10.3 dB	17.3 dB
Super 7	3.8 dB	8.3 dB	14.1 dB
RG-11	2.9 dB	6.7 dB	11.7 dB
1" open	0.26 dB	1.2 dB	2.9 dB
6" open	0.13 dB	0.32 dB	0.58 dB
1/2"/500	0.35 dB	0.9 dB	2.6 dB

How far can I go???

Transporting VHF and/or UHF TV signals over very long distances, on the ground, can be a challenge. First we have cable losses to consider (see table upper right). A 100 metre length of transmission cable can lose as much as 6.4 dB at 50 MHz (region of NZ terrestrial channel 1, Australian channel 0) and at 650 MHz the same cable will have losses greater than 22 dB.

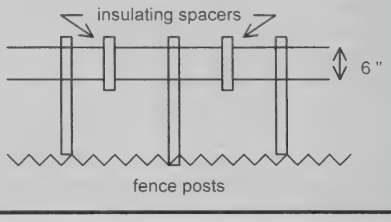
On the other hand, if you select a lower loss coaxial cable, such as cable TV .500 (1/2") hard-line, you can trim those losses to as little as 0.35 dB at 50 MHz and 2.6 dB at 650 MHz. The primary advantage to coaxial cable is it is easy to deploy - simply pull off the cable, leave it laying on the ground if necessary, strap it to fence posts, hang it in the trees. The cable has complete shielding and you don't have to worry about outside influences as long as nothing breaks the cable's jacket and gets into the shielding weave under the weather proofing jacket.

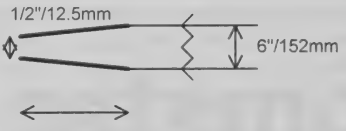
RG-59 is cheap. 1/2" cable TV hard-line is expensive or difficult to locate and it requires special connectors. If we go back in time to the 1930s, we discover a more efficient, typically far cheaper option. It is called *open wire line* and consists of two parallel pieces of copper or copper covered wire with plastic or Teflon or another dielectric insulating material used as a line (one side from the other side) "spacer" every foot or so. Open wire line was popular in the 1950s and 60s, is still available if you look hard enough, typically in a 300 ohm or 450 ohm format. The "ohms" measures the impedance of the line and it turns out that within reasonable limits, a 600 ohm line has less loss than 300 or 450 ohm. But, alas, 600 ohm line is almost impossible to find. So people make their own.

Consider the table lower right. A text book length of 600 ohm line will deliver a 110 dBuV output 50 MHz region TV channel over the astounding distance of 38.462 kilometres and only lose 50 dB in the process. So if you started with a typical modulator or signal processor at channel 2, 38.642 kilometres later you'd have 60 dBuV. Or at 230 MHz (highest band III TV channel), you'd go 15.625 kilometres. Or even at 650 MHz (the band IV/V region), 8.6 kilometres.

Most likely the most impossible installation you are likely to be faced with will require a kilometre or less of transmission line from a distant elevated hilltop to reach the TV set(s) below. You could do this by placing an amplifier on the hilltop with the antenna, feed the TV signal(s) down a fence line which supports not textbook copper or copper clad 600 ohm line, but a self-fashioned approximation of this line using galvanised fencing wire and some home-made spacers between the fence posts. The challenges are as follows: First, the two parallel sides of the line should be taunt from post to post - that sounds like any animal fence line so far. Next, when they pass the posts, some way of insulating the wires from the posts is required. 3" screw eye insulators nominally for 300 ohm line might work. Then between the fence posts, some insulating material to maintain the spacing at 6" line to line even when the wind blows.

"Real fencing wire" should be kept at least 12" away from the nearest "feed line" wire to prevent coupling effects. At each end of the line (one at the antenna + amplifier, one at the bottom with the TV sets), gradually taper the line from 6" spacing to 1/2" spacing over a *full* wavelength at the lowest TV channel frequency carried on the line. This taper forms an impedance transformer from 600 ohms to 300 ohms. And from 300 you can use an appropriate matching transformer to get down to 75 ohms (unbalanced) for a short length of coax to connect up equipment.





start of taper to end of taper is one wavelength at lowest frequency to be carried on line - with propagation factor

50 dB of cable loss

If you start with +110 dBuV, how far away is 60 dBuV at end of line?

+110dBuV	50 MHz	230 MHz	650 MHz
RG-59	781 m	387 m	223 m
RG-6	1020 m	485 m	289 m
Super 7	1315 m	602 m	355 m
RG-11	1724 m	746 m	427 m
1"	19,230m	4,167 m	1724 m
6"	38,462 m	15,625 m	8,620 m
1/2"/.500	14,286 m	5,556 m	1,923 m

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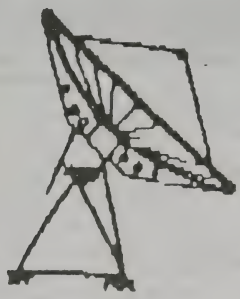

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SatFACTS Pacific/Asian MPEG-2 Digital Watch: 15 August 2000

Bird	Service	RF/IF &Polarity	# Program Channels	FEC	Msym	Receivers and Errata
I703/57E	Sky News	4143/1007R	1	3/4	5(.632)	NDS encrypted, **often FTA**
I704/66E	TV5	4055/1095R	4	3/4	27(.500)	**FTA**
	Sky News +	3805/1345R	4	3/4	22(.520)	Sky News 24 hr, sport, feeds; **some FTA**
Ap2/76E	Hmark/Kermt	3720/1430H	4	5/6	29(.270)	PowVu, typ. CA
	Channel "I"	382301330V	1	3/4	3(.570)	Tests, FTA
	TVB8 +	3849/1301H	4	3/4	13(.238)	PowVu, CA
	AXN	3920/1230H	up to 8	7/8	28(.340)	Tests, promos, **ch 5 FTA**
Thcm3/78.5E	**MRTV**	3666/1484H	1	2/3	4(.442)	FTA; difficult to load (NTSC)
	Mega +	3640/1510H	12	3/4	28(.056)	Mega Cosmos here; new Sr
	Mahar/DD1	3600/1550H	up to 8	3/4	26(.661)	FTA (includes VTV, DDR)
	TRT +	35501600H	2+ TV, radio	3/4	13(.330)	3 Angels USA + 9 radio
	PTV2	3420/1730V	1	3/4	3(.366)	FTA, new service, testing
	TV Maldives	3412/1738V	1	1/2	6(.312)	FTA (reaches SE Australia)
	Thai Global+	3425/1725V	up to 7?	2/3	27(.500)	FTA
Insat 2E/83E	**DD2**	3910/1240V	1	3/4	5(.000)	SCPC, testing MPEG-2
	DD tests	3929/1221V	1	3/4	5(.000)	SCPC, weaker than 3910 above
ST1/88E	Taiwan Bqt	3509/1641H	13	3/4	23(.450)	MCPC, **sometimes FTA**, 2 adult chs
MeSt 1/91.5E	**Malay. TV3**	4147/1004H	1	3/4	7(.030)	CA but occ. FTA
As2/100.5E	**Euro Bouqt**	4000/1150H	5TV, 19r	3/4	28(.125)	FTA (TV5 teletext)
	Reuters	3909/1241H	1	3/4	5(.632)	occasional feeds, **some FTA** MPEG2
	Hubei/HBTV	3854/1296H	1	3/4	4(.418)	FTA SCPC, teletext
	Hunan/SRT	3847/1303H	1	3/4	4(.418)	FTA SCPC, teletext
	Guan./GDTV	3840/1310H	1	3/4	4(.418)	FTA SCPC, radio APID 81
	In. Mongolia	3828/1322H	2	3/4	8(.397)	FTA: #1 Mongolian, #2 Mandarin
	APTN A-O	3799/1351H	1	3/4	5(.631)	mostly CA SCPC (news feeds)
	WTN Jer/Lon	3790/1360H	1	3/4	5(.631)	Mostly CA; **some FTA**
	Reuters/Sing.	3775/1375H	1	3/4	5(.631)	**FTA** & CA
	WorldNt/US	3764/1386H	1 + 20 radio	3/4	6(.100)	FTA; up to 20 radio channels
	Liaonin/Svc2	3734/1416H	1	3/4	4(.418)	FTA SCPC, radio APID 256
	Jiangx/JXTV	3727/1423H	1	3/4	4(.418)	FTA SCPC, teletext, radio APID 81
	Fujian/SETV	3720/1430H	1	3/4	4(.418)	FTA SCPC, + radio APID 80
	Hubei TV	3713/1437H	1	3/4	4(.418)	FTA SCPC, radio APID 80
	Henan/Main	3706/1444H	1	3/4	4(.418)	FTA SCPC, + radio
	Egypt/Nilesat	3640/1510H	6+, radio	3/4	27(.850)	Thru TARBS Aust, subs now OK
As2/100.5E	**Feeds**	4086/1064V	1	3/4	5(.632)	FTA SCPC feeds
	TVSN	4033/1117V	1	3/4	4(.298)	Occ. **FTA**, not same as Aust. version
	Sky Racing	4020/1130V	up to 3TV	1/2	18(.000)	(Irdeto) CA; **1 & 3 occ. FTA**
	EMTV	4006/1144V	1TV, 2 radio	3/4	5(.632)	PowVu CA; poor signal level
	Jilin Sat TV	3875/1275V	1	3/4	4(.418)	FTA SCPC, + radio
	HeiLongJian	3834/1316V	1	3/4	4(.418)	FTA SCPC
	JSTV	3827/1323V	1	3/4	4(.418)	FTA SCPC, + radio
	Anhui TV	3820/1330V	1	3/4	4(.418)	FTA SCPC
	ShaanxiQQQ	3813/1337V	1	3/4	4(.418)	FTA SCPC, radio APID 81
	Guan/GXTV	3806/1344V	1	3/4	4(.418)	FTA SCPC, radio APID 257
	Fashion TV	3796/1354V	1	3/4	2(.533)	FTA SCPC, now easy to load
	MSTV	3791/1359V	1	3/4	4(.340)	FTA SCPC
	Feeds	3785/1365V	1	3/4	5(.632)	FTA & CA, feeds
	Myawady	3766/1384V	1	7/8	5(.080)	FTA SCPC - difficult to load
	SABe	3742/1408V	1	3/4	3(.300)	SCPC - now regular programming
	Saudi TV1	3660/1490V	1 (?)	3/4	27(.500)	FTA MCPC
As3S/105.5E	Zee bouquet	3700/1450V	9TV	3/4	27(.500)	Mediaguard CA, **ch 8 FTA**
	Arirang TV	3755/1395V	1	7/8	4(.418)	FTA SCPC; audio problems
	Now TV	3760/1390Hz	2	7/8	26(.000)	Now operational FTA
	Star TV	3780/1370V	17(+)TV	3/4	28(.100)	NDS CA (Pace DVS211, Zenith)
	Star TV	3860/1290V	14(+)TV	3/4	27(500)	NDS CA (Pace DVS211, Zenith)
	Star TV	3880/1270II	12(+)TV	7/8	26(.850)	NDS CA (Pace DVS211, Zenith)
	CNNI	3960/1190H	4(+)TV	3/4	26(.000)	PowVu CA; some **FTA** feed channels
	Star TV	4000/1150H	7(+)TV	7/8	26(.850)	NDS CA (Pace DVS211, Zenith)
	Sun TV	4095/1055H	1	3/4	5(.554)	testing SCPC
	CCTV bqt	4115/1035H	4(+) TV	3/4	19(.850)	was analogue; now FTA MCPC
Cak1/107.5E	Indovision (S-band)	2.536, 2.566, 2.596, 2.626	33(+) TV	7/8	20(.000)	NDS CA using RCA/Thomson, Pace IRDs; new services added June
Sinosat/110E	**CCTV2**	3889/1261Hz	1	3/4	3(.000)	FTA SCPC, difficult to load
C2M/113E	**TPI**	4185/965V	1	3/4	6(.700)	FTA SCPA; NT only
	News Asia	4074/1076V	1	3/4	14(.043)	May only be test; NT+Asia only?
	Anteve	4055/1095V	1	3/4	6(.510)	FTA SCPC; NT only
	Space TV	4000/1150H	11TV, radio	3/4	26(.666)	CA, sometimes **FTA**
	C Net Taiwan	3760/1390H	11TV, radio	3/4	26(.666)	CA, subs available **-10 radio FTA**

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Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym	Receivers and Errata
(C2M/113)	**RCTI**	3475/1675H	1	3/4	8(.000)	FTA SCPC, Australia OK
JcSat3/128	Miracle Net	3990/1160V	3 up to 6	5/6	22(.000)	PowVu, some **FTA** (1,3)
	Asian bqt	3960/1190V	up to 8	7/8	30(.000)	CA & **FTA** Ntsc: Japan, Taiwan
L AP1/130	**THT+NTV**	3675/1475L	2 + 2 radio	3/4	12(.000)	inclined orbit +/-3.5 degrees
MeaSat 2	Astro Mux	11.478H (+)	up to 7TV	7/8	30(.000)	Aust east coast beam; also 11.664Hz
	Mediasat	11.540Hz	1+TV, tests	3/4	30(.800)	Tests to determine Aust coverage
Op B3/156	Mediasat	12.336V	5TV, 3ra, Inter.t	2/3	30(.000)	Pv, Nagravision, Irdeto; **some FTA**
	Aurora	12.407V		2/3	30(.000)	CA, $105 smart card required (p. 28)
	Aurora	12.532V	Inc Zee, ATV	2/3	30(.000)	cvrs Aust, NZ 90 cm; CA
	Aurora	12.595V		3/4	30(.000)	CA, $105 smart card required (p. 28)
	Aurora	12.720V		3/4	30(.000)	CA, $105 smart card required (p. 28
	Austar/tests	12.376H		3/4	29(.473)	Austar I-TV tests
	Austar/Foxtl	12.438H		3/4	29(.473)	CA, subscription available Australia
	Austar/Foxtl	12.564H		3/4	29(.473)	CA, subscription available Australia
	Austar/Foxtl	12.626H		3/4	29(.473)	CA, subscription available Australia
	Austar/Foxtl	12.688H	(some FTA ra)	3/4	29(.473)	CA, subscription available Australia
Op B1/160	**ABC NT fd**	12.256V	1TV, 3 radio	3/4	5(.026)	FTA, Sydney -30 minutes time zone
	Central 7	12.354H	1TV	3/4	3(.688)	FTA, purpose here unknown
	News feeds	12.367H	1	3/4	5(.424)	FTA
	Sky NZ	12.518/546V	7TV/7TV	3/4	22(.500)	NDS CA, subscription available NZ
	Sky NZ	12.581/608V	6TV/6TV	3/4	22(.500)	NDS CA, subscription available NZ
	Sky NZ	12.644V	9TV	3/4	22(.500)	NDS CA, subscription available NZ
PAS8/166	**ABCInterch**	12.312H	1	3/4	6(.978)	PowVu, FTA, news feeds
	ABCInterch	12.321H	1	3/4	6(.978)	PowVu, FTA, news feeds
	ABCInterch	12.330H	1	3/4	6(.978)	PowVu, FTA, ABC Melbourne feeds
	TARBS	12.526H	12+ TV	3/4	28(.067)	TPG /Eurodec CA, occ. FTA
	TARBS2	12.606H	6+TV	3/4	28(.067)	Tests, inc. ESPN, see TARBS above
	JEDI/TVB	12.686H	11+ TV	3/4	28(.124)	Irdeto CA, **some FTA** tests
	Boomerang	12.725H	5 TV	7/8	25(.728)	CA, subscriptions avail Australia
	NHK Joho	4065/1085H	6TV, 1 radio	3/4	26(.470)	PowVu CA & **FTA**; subscription avail
	ESPN USA	4020/1130H	7+TV, data	7/8	26(.470)	PowVu CA; ch 11 DCP-CCP bootload
	Discovery	3980/1170H	8 typ.	3/4	27(.690)	PowVu/CA (some audio **FTA**)
	CalBqt/Pas8	3940/1210H	up to 8TV	7/8	27(.690)	PowVu CA & **FTA (EWTN/EB Net)**
	CNBC HK	3900/1250H	up to 7TV	3/4	27(.500)	FTA at this time
	Feeds	3854/1296Hz	1	3/4	6(.110)	occ. feeds
	CNNI	3780/1370H	3, up to 5 TV	3/4	25(.000)	PowVu, FTA at this time
	MTV	3740/1410H	8	2/3	27(.500)	CA; #7,8 **FTA feeds**
PAS2/169	Pv Bouquet	12.290V	2+ TV, radio	2/3	27(.500)	PowVu CA, WIN, ABC NT
	WA PowVu	12.637(.5)V	4TV, 8 radio	1/2	18(.500)	PowVu CA, WA only - D9234
	HK PowVu	4148/1002V	up to 8	2/3	24(.430)	PowVu CA; some **FTA**
	Fox Bouquet	3992/1158V	8TV/data	7/8	26(.470)	Pv, CA/FTA (**Fox News USA, sports**)
	Feeds	3942/1208V	1 or 2	2/3	7(.497)	PowVu (FTA) occ feeds
	Feeds	3934/1216V	1	3/4	10(.850)	PowVu (FTA) occ. feeds
	Feeds	3929/1121V	1	3/4	6(.618)	Mediasat links, PowVu, usually FTA
	Feeds	3912/1238V	1	2/3	6(.620)	PowVu(FTA) occ. feeds
	Feeds	3898/1252V	1	2/3	12(.000)	(PowVu) FTA, occ. feeds
	Feeds	3812/1338V	1	3/4	6(.620)	PowVu (FTA) occ feeds
	Middle East	3778/1372V	4	3/4	13(.331)	FTA, testing CA, "threatening"
	Service 1	3761/1389V	1	3/4	6(.620)	FTA SCPC feeds (occasional use)
	CCTV Pv	3716/1434V	5 typical	3/4	19(.850)	PowVu FTA; # pgm chs varies
	Feeds	4138/1012H	1	3/4	6(.620)	FTA SCPC/MCPC, news and sports
	7thDyAdv	3872/1278H	1TV, 4+ audio	3/4	6(.620)	Sat, Sun 0930 UTC typ.
	CNNI HK	3996/1154H	1	3/4	9(.998)	reverse link HK/Atlanta, feeds, FTA
	"1"/Korea	3980/1170H	1	3/4	4(.420)	FTA SCPC VPID 33, APID 36
	Feeds	3867/1183H	1	2/3	6(.618)	FTA (occ. sport feeds)
	Feeds	3939/1211H	2 (typ NTSC)	2/3	6(.620)/7(.498)	FTA-typ. NTSC-occ. sport, shuttle
	Cal PowVu	3901/1249H	up to 8	3/4	30(.800)	(PowVu) CA+**FTA**; UEC642 ?
	Feeds	3854/1296H	1	2/3	6(.620)	(PowVu) occ. feeds
	Disney	3804/1346H	3	5/6	21(.093)	PowVu CA
	Satcom 1-6	3743/1407H	up to 5	7/8	19(.465)	currently FTA, lowlevel, Mid East fds
I702/177E	AFRTS	4177/973LHC	8TV, 12+ rad	3/4	26(.694)	PowVu CA
I701/180E	**TNTV**	11.070V	9	3/4	30(.000)	Testing new pay-TV service, east beam
	Tele Fenua	11.168V	4	3/4	10(.100	Testing new pay TV service, east beam
	Canal+ Sat	11.610H	16TV, 1 radio	3/4	30(.000)	Mediaguard CA, one **FTA**

Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym	Receivers and Errata
(1701/180E)	TVNZ	4195/955RHC	1	3/4	5(.632)	DMV/NTL early version, occ feds, typ ca
	TVNZ/BBC	4186/964RHC	1	3/4	5(.632)	DMV/NTL early version, occ feds, typ ca
	TVNZ	4178/972RHC	1	3/4	5(.632)	DMV/NTL early version, occ feds, typ ca
	TVNZ/Aptn	4170/980RHC	1	3/4	5(.632)	DMV/NTL early version, occ feds, typ ca
	RFO-Canal+	4095/1055L	4TV, radio	5/6	13(.343)	east hemi 20.5 dBw, to be 15.5 soon
	TVNZ feeds	4044/1106R	1	3/4	5(.632)	SCPC, mixed CA and **FTA** feeds
	NZ Prime TV	4024/1126L	1	2/3	6(.876)	PowVu CA; Auckland net feeds
	NBC to 7 Oz	3960/1190R	1	7/8	6(447)	CA, Leitch encoded
	RFO Polycast	3858/1292L	1	3/4	4(.566)	FTA SCPC; East Hemi Beam-Tahiti
	TVNZ	3846/1304R	1	3/4	5(.632)	SCPC, mixed CA & **FTA**, feeds
	10 Australia	3765/1385R	6	7/8	29(.900)	PowVu CA & **FTA; #3 TBN**

BOUQUETS - FTA vs. CA: FTA (free to air) services appear as SCPC (single channel per carrier) and within MCPC (multiple channels per carrier). FTA services here are shown **bold face**, when FTA is occ(asional) or only for a portion of MCPC bouquets, **bold face** appears in right hand column. PowVu stands for Scientific Atlanta PowerVu which is accessible even when FTA only when the IRD has been software-designed to process SA's unique version of MPEG-2. SA IRDs, such as D9223, can be equipped with MPEG-2 standard or may only be capable of receiving SA's version of MPEG-2, even for FTAs services. SA offers an over-the-air software update for existing non-MPEG-2 versions of the receiver (see bottom of this page). Not all receivers automatically receive MPEG-2 transmissions which have variations of the MPEG-2 software "standard." In Mediasat's Optus B3 service, for example, Thasi5 is difficult to load for some IRDs unless you enter the PID numbers for the service. PID numbers are discussed in our web site (http://www.satfacts.kwikkopy.co.nz). Not all IRDs can deal with PID entry - virtually all 1999 and 2000-new models will do this. In tables, "# Programme Channels" indicates the total number of video + accompanying audio the IRD should load if you load the bouquet. Most IRDs ask you if you wish to load "FTA Only?" or "All including CA." Typically, load "all" even if you cannot routinely access CA services.

MPEG-2 DVB Receivers: (Data here believed accurate; we assume no responsibility for correctness!)

ADI MediaMate. FTA, NTSC+PAL outputs. (Pacific Digital Sys. Pty Ltd, tel 61-2-8765-0270)
AV-COMM R3100. FTA, excellent sensitivity (review SF May 1998); new version Sept. '99. Av-COMM Pty Ltd, 61-2-9949-7417.
Benjamin DB6600-CA. FTA, Foxtel/Austar w/CAM+card. Autosat Pty Ltd 61-2-9642-0266 (review SF#72)
Grundig DTR1100. Mfg by Panasat (SA), very similar to Panasat 630; out of production, Irdeto capable. See Av-COMM above.
Humax F1-CI. Primarily sold for TRT(Australia), does (limited) PowerVu (not Optus Aurora approved).
Hyundai-TV/COM. HSS100B/G (Pacific), HSS-100C (China) FTA. Different software versions; 2.26/2.27 good performers, 3.11 and those with Nokia tuners also good; later 5.0 not good. SATECH (V2.26)
Hyundai HSS700. FTA, PowerVu, SCPC/MCPC. Review SF March 1999. Kristal Electronics, 61-7-4788-8906.
Hyundai HSS800CI. FTA, Irdeto (with CAM) + other CA systems, PowerVu, NTSC. Kristal Electronics, above; review SF#63.
MediaStar D7. FTA, preloaded w/ known services, exc. software (review SF July 1998). MediaStar Comm. Int. 61-2-9618-5777
MediaStar D7.5. New (May 00) single chip FTA; review June 00 SF. MediaStar Comm. Int. 61-2-9618-5777
MultiChoice (UEC) 660. Essentially same as Australian 660, not grey market contrary to reports. Sciteq tel 61-8-9306-3738
Nokia "d-box" (V1.7X). European, FTA, may only be German language, capable of Dr. Overflow software. Tricky to use.
Nokia 9200. When equipped with proper CAM, does Aurora, pay-TV services provided software has been "modified" with Dr Overflow or similar program (www.BAKKERELECTRONICS.COM- Note: This site shut-down by Mindport early November - may not be functioning!). Reported factory 12 mo. warranty. Peter Older, tel 61-3-5133-7911, mobile 61-0418-386287
Nokia 9500/9600. Numerous versions for different world parts; not distributed in Pacific but assistance from Av-Comm Pty Ltd.
Nokia 9800. Latest single chip version, with CI and Irdeto capable. No software for Pacific, Asia; not recommended.
Pace DVS211. NDS CA (no FTA) for Star Asia, previously used for Indovision. (Solution 42, 61-2-9820-5962)
Pace DGT400. Originally Galaxy (Now Foxtel+Austar). Irdeto, some FTA with difficulty (Foxtel Australia 1300-360818)
Pace DVR500. Original DGT400 modified for NBC (PAS-2) affiliate use, with CAM equivalent to DGT400 but more reliable.
Pace "Worldbox" (DSR-620 in NZ). Non-DVB compliant NDS CA including Sky NZ, no FTA; similar "Zenith" version.
Pacific Satellite DSR2000. Advises no longer current model (see. p. 2, here); Clone of Mediastar D7 (see above)
Panasat 520/630/635. MCPC FTA, Irdeto capable, forerunner UEC 642, 660. Out of production, spares fax ++27-31-593-370.
Panasonic TU-DS10. FTA + Irdeto CA; one of 2 IRDs approved by Optus for Aurora, but no longer available in Australia.
Phoenix 111, 222. PowVu capable, NTSC, graphics, ease of use. (111 review SF#57). SATECH(below)- 222 out of production
Phoenix 333. FTA SCPC, MCPC, analogue + dish mover. Detailed SF review Nov. 1998. SATECH 61-3-9553-3399.
Pioneer TS4. Mediaguard CA (no FTA), embedded Msym, FEC, only for Canal+Satellite (AntenneCal ++687-43.81.56)
PowerCom. FTA, PowVu, NTSC, excellent sensitivity. NetSat 61-2-9687-9903.
PowerVu (D9223, 9225, 9234). Non-DVB compliant MPEG-2 unless loaded with software through ESPN Boot Loader (see below). Primarily sold for proprietary CA (NHK, GWN+ PAS-2 Ku, CMT etc). Scientific Atlanta 61-2-9452-3388.
Praxis/DigiMaster 9600 MKII/9800AD. FTA, PowVu+analogue, withdrawn from sale in Pacific (was Skyvision-below)
Praxis 9800 ADP. FTA SCPC/MCPC, PowVu, analogue, positioner. SF review Dec '98; withdrawn from Pacific sale (below).
Prosat 2102S. FTA SCPC/MCPC, NTSC/PAL, SCART + RCA. Sciteq 61-8-9306-3738.
SatCruiser DSR-101. FTA SCPC/MCPC, PowVu, NTSC/PAL. (Skyvision Australia 61-2-6292-5850, Telsat 64-6-356-3749)
SatCruiser DSR-201P. FTA SCPC/MCPC, PowVu, NTSC/PAL, analogue, positioner - review this issue (Skyvision - see above).
Skandia SK888 (aka DigiSkan-SMS). FTA MCPC, Irdeto CAM+software upgrade. Out of production; Skandia 61-3-9819-2466
Strong SRT 4600. SCPC, MCPC, PowerVu; exc graphics, ease of use, review SF#64. SATECH 61-3-9553-3399.
Sky 21/SJ 3000ci. Claims "clone" Hyundai HSS800ci; if so, poor copy. Runs very hot, reportedly burns up smart cards
UEC642. Designed for Aurora (Irdeto), approved by Optus; limited other uses. Nationwide 61-7-3252-2947.
UEC660. Upgraded UEC642, used by Sky Racing Aust., Foxtel-limited FTA. (Nationwide - above); power supply problems.
UEC770. Single chip Irdeto built-in design for Foxtel; unfriendly for FTA. Power supply problems, not sold to consumers.
Xanadu. DVB compliant special receiver for members of SPACE Pacific (Av-comm Pty Ltd, tel +61-2-9949-7417)
Yuri HSS-100C. FTA, clone of Hyundai, V2.27 software custom to Australia (Nationwide-above).

Accessories:

Aurora smart cards. New v1.6 now available, 1.2 no longer available for RABS. Price now A$105, Sciteq 61-8-9306-3738.
PowerVu Software Upgrade: PAS-8, 4020/1130Hz, Sr 26.470, 7/8; pgm ch 11 and follow instructions (do not leave early!)

SatFACTS Pacific/Asian FTA ANALOGUE Watch: 15 August, 2000

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BIRD/ Location	RF/IF & Polarity	Service	Errata
I703/57E	3808/1342R	Udaya TV	
	4052/1098R	WorldNet	VOA subcrs.
	4178/972L	MTA Inter.	
I604/602/60E	4166/984	various feeds	
I704/66E	3765/1385R	tests	
	4015/1135L	Mongolia	(SECAM)
PAS4/68.5E	3743/1407V	RTPi	(+ radio subcr)
	3864/1286V	BBC World	
	3907/1243H	Sony TV	Hindi
	4034/1116V	Doordan	(various)
	4087/1063H	CNNI	
	4110/1040H	TNT/Cartoon	
	4113/1037V	Series Ch.	
	4182/968H	MTV	
PAS7/68.5E	3470/1680V	test signal	
LM1/75E	3980/1170V	various	(Madagascar)
Thaicom3/78E	3871/1279H	TVT	
	3760/1390V	Army TV	
	3685/1465V	MRTV	
	3685/1465H	VTV	6.6, 7.02
	3616/1534V	ATN	
	3576/1574V	ATN Bangalr	Bengali
	3554/1596V	test card	
	3536/1614V	Punjabi TV	(occ service)
	3507/1643V	RAJ-TV	
	3489/1661H	Vasta Music	occ tests
	3465/1685V	RAJ-TV	
Expres 6A/80E	3675/1475R	RTR	(global beam)
InSat 2E/83E	3481/1669V	Sun TV	
	3562/1588V	Vijay/Asianet	aud. 5.5/6.6
	3599/1551V	JayaTV	
	3810/1340V	DD1-Tamil	"
	3850/1300V	DD1-National	"
	3930/1220V	DD2 Metro	"
	3970/1180V	Teluga 1	"
	3998/1152V	sport feeds	"
	4035/1115V	Sun TV	"
	4060/1090V	Surya/Sun TV	"
	4093/1057V	DD7	"
ChnStr1/87.5E	3880/1270H	occ feeds/ card	P4 NSW, Ntsc
ST1/88E	3550/1600V	test card	
	3582/1568V	Nila TV	(vintage TV)
CIS S6/90E	3675/1475R	RTR1	P3 NSW
	3875/1275R	Orbita 1	
	3916/1234R	RTR II	
	3935/1215R	Orbita II	
MeSat-1/91.5E	3710/1440H	VTV1,2, 4	
	3880/1270H	RTM-1	
Chinasat22/98	3900/1250H	tests	+ 3940/1210
InSat 2B/93.5E	4165/985H	India Metro	NSW on 3.7m
	4080/1070V	DD7 (Tamil)	
	4070/1080H	DD9	
	3970/1180V	DD9 (Kan.)	
	3882/1268V	DD1	
	3840/1310V	DD?	
	3762/1388V	DD4	
AsSat2/100.5E	3660/1490V	feeds, tests	
	3680/1470H	feeds	
	3860/1290V	feeds	

BIRD/ Location	RF/IF & Polarity	Service	Errata
(As2/100.5E)	3885/1265H	WorldNet	VOA subcrs
	3960/1190H	CCTV4	
	3980/1170V	RTPi	(radio gone)
CIS S21/103E	3675/1475R	RTR	
	3875/1275R	Vrk Apt	
ASs3S/105.5	3660/1490V	Urdu TV Net	6.6, 7.2 audio
	3680/1470H	CETV	
(temp FTA)	3800/1350H	Star Sport	NTSC
(temp FTA)	3840/1310H	Channel [V]	NTSC
	3900/1250V	AlphaTV Punja	
(temp FTA)	3920/1230H	Phoenix Ch	NTSC
	3940/1210V	Zee India	
	3980/1170V	Zee TV	
	4020/1130V	Sahara TV	6.2, 6.8
	4100/1050V	PTV2/World	
T'kom1/108E	4000/1150H	tests	
PalapC2/113E	4160/990H	(France) TV5	
	4140/1010V	Brunei + feeds	
	4120/1030H	MTV Asia	
	4080/1070H	Herbalife	+ tests
	4040/1110H	CNBC	
	3970/1180V	CNNI	
	3880/1270H	Aust ATN7	
	3840/1310H	TVRI	tests
	3742/1408V	RCTI	English subcr
AsSat1/122E	3677/1473V	Test card	& 3933/1217H
ChinS 6/125E	4085/1065V	feeds	seldom seen
JcSat3/128E	3768/1382V	feeds	occ., P5 NZ
	4085/1065V	test card	NTSC. 6.8 aud.
Ap1A/134E	4160/1050V	CETV	
	3980/1170V	CETV1	
	3900/1250V	CETV2	
Ap1A/138E	4160/990H	CCTV7	
G25/140E	3675/1475R	ORT Moscow	+/-3d. inclined
	3875/1275R	feeds, tests	
LMAP2/142.5	3675/1475L	occ. tests	+/- 3 deg inc.
Gorizont 33	3675/1475R	tests	+/- 1.2 deg inc
	3875/1275R	RTR	pgme audio 7.5
Ag2/146E	3787/1363H	GMA	P1/2 s. eqtr
Me2/148E	4080/1070H	test card	occ. use
PAS8/166.5E	3880/1270V	test card, feeds	not full time
	3865/1285H	Napa test card	not fulltime
PAS2/169E	3940/1240V	Napa test card	
1802/174E	4166/984R	Feeds	
	4177/973R	Feeds	
I702/177E	4166/984R	Feeds	inc. KBS Korea
	4187/963R	Occ. feeds	
I701/180E	3810/1340R	Occ. feeds	
	3841/1309L	RFO	East Beam
	3845/1305R	Occ. feeds	inc. from USA
	3930/1220R	USA net feeds	**FTA** & encrypt

"Unusual" CA formats

PAS4/68.5E	3785/1365V	Discovery India	BMAC
	3860/1290H	ESPN India	BMAC
Ap2/76E	3960/1190H	HBO Asia	GI Digicipher2
C2/113E	3930/1220H	Filip. Peo. Net	GI 1.5 MPEG
Ap1/138E	4100/1050V	ESPN	BMAC
PAS2/169E	4028/1122H	ABS/CBN	GI 1.5 MPEG

FINDING YOUR WAY AROUND INDUSTRY RELATED WEB SITES

For those owning or contemplating home PCs with modems, Internet provides a valuable resource which enhances your personal use of satellite communications. What follows is not a tutorial in getting on "the Web" nor clicking through your PC's software to connect to Internet. We assume you are at least that far with the following.

(A) Australian legislation affecting dish system equipment. As reported on p. 1, here, a bill introduced by Senator Allston could redefine the technical specifications "allowed" for IRDs sold into Australia. The status of this legislation will be found at:

1) Enter http://www.aph/gov.au/legis.htm
2) Click on "Current bills"
3) Click on "Copyright Amendment (digital agenda)"
4) Click on "text bill"
5) Click on PDF and read in particular pages 30 - 35, or in Acrobat format read pages 34 - 39
6) Read history of this bill and statements made in support of the legislation by Members of the House (same page as "text bill").

(B) Craig Sutton's Asia Pacific FTA Web site. Homey, newsy, Craig stays on top of changes reported by other sites and compiles information of interest to this portion of the world. A labour of love, usually updated daily. http://www.homepages.ihug.co.nz/~suttonc.index.html.

(C) Christian Lyngemark's hugely successful world satellite site (http://www.lyngsat.com/) with daily updates posted to those who "contribute material." Drawing from thousands of daily users, this site is the world source for information on satellites, transponders, digital parameters and nobody does it better.

(D) Our own http:www.satfacts.kwikkopy.co.nz site which provides latest transponder news for Pacific + Asia, and in depth reports similar to what you would expect from SatFACTS. Typically updated daily.

(E) All satellite operators maintain their own sites to provide technical and other information about their birds. One example is http://www.panamsat.com.

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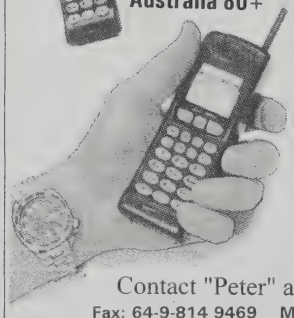

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TUNING IN THE INDUSTRY'S TV PROGRAMME

SPACE Pacific, the Asia-Pacific industry membership trade association, has produced (and continues to produce) a series of one hour television programmes. These "SPACE Pacific Report" shows, hosted by Bob Cooper, cover a range of topics of interest to installers and enthusiasts. Show numbers and content are as follows: **#9901-** Spectrum Analyser techniques, **#9902-** Feeds and LNBs, **#9903-** Dish antenna designs and problems, **#9904-** The dish marketplace, and, "tiny parts," **#9905-** Dr Overflow (Nokia) software, **#9906-** How the uplink works (tour of RCA's Vernon Valley site), **#9907-** Uplink Two, including uplink transmitters, **#9908-** Digital Basics (Mark Long), **#9909-** Real World Installs (Mark Long), **#9910** - Installing a polar mount dish and signal level test equipment, **#9911** - "SPIN" (the hidden side of satellite). **#0012** - First Report from SPRSCS 2000 (recorded in Melbourne June 28, 29 - "Ideal IRDs," more), **#0013** - Second Report from SPRSCS 2000 (recorded in Melbourne June 29, 30 -"ABA Blackspot session"), **#0014** - Naughty Nokia from SPRSCS 2000. "Report" is broadcast by Mediasat on Optus B3, 12.336Vt, ad-hoc channel 3(*) (Sr 30.000, FEC 2/3) with the following coming-weeks schedule: **Sunday August 20 -** Show 0013, 0200-0300 UTC (1400 NZT, 1200 AET, 1000 Western Australia; repeats 0700 UTC/7PM NZT, 5PM Sydney, 3PM Perth). **Sunday August 27**- Show 9901, 0200-0300UTC (1400NZT, 1300 A summer time Sydney, 1000 Western Australia, repeats 0700UTC/7PM/6PM/3PM); **Sunday September 3** - Show 9902, same times as August 27; **Sunday September 10** - Show 9903, same times as August 27; **Sunday September 17** - Show 9904, same times as August 27; **Sunday September 24** - Show 0014, same times as August 27. (* - Mediasat may pre-empt showings, check other bouquet channels - such as 5 - if not on 3.) SPACE Pacific Report has also been broadcast by Westlink, Aurora service on Optus B3, vertical (12.595, Sr 30.000, FEC 3/4 - requires Optus Aurora card but is otherwise FTA). Westlink will again carry SPACE Pacific Report when new shows currently in planning are produced and available; details here in October (will start after November 1). In the event of schedule changes (*), SPACE Pacific attempts to pre-announce which show(s) will appear through the SatFACTS Web site prior to each weekend (http://www.satfacts.kwikkopy.co.nz). SPRSCS 2000 sessions taping scheduled for play on Mediasat and Westlink are currently in "editing production" for presentation through late September-October-November. Sponsorship of SPACE Pacific Report. In general answer to queries - AvComm, Satech and Sciteq have contributed corporate funding to make possible the production of the first set of nine SPACE Pacific Report programmes. Additional funding from Ikusi Australia NZ Pty Ltd. has been received for final production of show 9910. Funds derived from sale of VHS tape copies are also an important element in meeting the (A)$1,300 overhead of each show. Mediasat and Westlink donate the time to broadcast the programmes, and both are to be commended for this support. Sponsorship of shows is available to commercial groups; contact Bob Cooper (e-mail Skyking@clear.net.nz; tel 64-9-406-0651).

WITH THE OBSERVERS

AT PRESS DEADLINE

Mediasat testing on Measat 2 148E was scheduled to "up" power level by at least 2 dB August 8th (see below). Comparisons between previous measurements and those after power increase appreciated. Mediasat is likely to use 1 or 2 transponders on Measat 2 on a regular basis by September. Get details from http://www.satfacts.kwikkopy.co.nz.

AsiaSat 2/100.5E: Euro bouquet is expanding to 8 video channels (from 5) mid-January, RTPi, currently analogue (3980Vt) is prime candidate for one slot, say they will be MPEG by January 22; Euro has extended As2 contract for five additional years. Radio services on RTPi (4 total) have shut down. 12.456Hz reception from Australia reported (**D. Pemberton**); also P2 in Timaru, NZ, FTA analogue CCTV. (**D. Hudson** with 3/7, KTI) EBU channel likely to feed Olympics in pro style 4:2:2 format MPEG on 3945/1205Vt, Sr 6.110, 3/4.

AsiaSat 3S/105.5E: Urdu TV Network is new on 3660/1490Vt, audio 6.6 & 7.2 FTA PAL.

AsiaStar A/105E: Now operating 1.473RHC and 1.475LHC L-band; any reports? Sr 1.840, FEC 1/2.

EchoStar 6/148W: Testing here, might be worth checking out in 12.225 - 12.700 (RHC, LHC) range.

Express 6A/80E: "As bad as it is - and that's pretty bad, this is best Russian analogue currently" (**D. Leach**., NSW).

Gorizont 25/140E: Formerly at 103E, this well aged bird is now at 140E (inclined 4.8) replacing an even older Gorizont (inclined at 5.8) at same location.

Gorizont 33/145E: Disappointing signal levels (3675, 3875), does not act like previous Gorizonts with high power global beam on 3675 (Australia, NZ reports), is inclined 1.4 degrees.

Intelsat 701/180E: RFO-Canal+ bouquet (4095/1155LHC, Sr 13.343, 5/6), which reduced power 7 dB July 1 is going to drop another 5 dB on or about 1 September (to 15.5 dBw). Sri Lanka v. Pakistan cricket found TVNZ 4161RHC, Sr 5.632, 3/4 FTA.

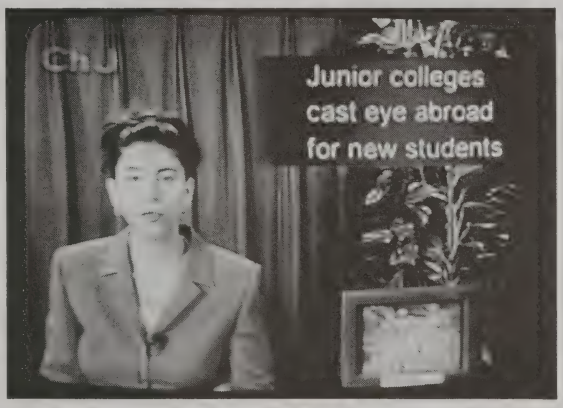
Intelsat 702/177E: Check 12.728. Sr 28.000, 2/3 as well as 12.635 Sr 8.880, 3/4.

JcSat 3: 3960/1190Vt, Sr 30.000, 7/8 has been running FTA movies (USA); will not last long (**Kosmalski**, NZ)

MeaSat 2/148E: Ku testing on 11.478, 11.540, 11.664 Hz works on dishes down to 30cm (!) in Sydney-Brisbane, but 1.8m is barely detectable in NZ (**Clough**, Wellington). 11.478, 11.664 is Sr 30.000, FEC 7/8 with CA and FTA feeds. 11.540 is Sr 30.800, FEC 3/4 test card plus. Sydney based Mediasat may lease two transponders here (including 11.540). Optus birds are "full" and it needs more spectrum - now.

Optus B1/160E: Sky NZ is warning installers NOT to do change out of Sharp brand LNB(f)s unless it is definitely bad. Trouble calls involving quick change out of LNB units has resulted in large number of not-bad-in-the-first-place turning up at Sky Auckland.

CHANNEL J is latest English language creation from Japan's NHK (PAS-8, 4065Hz, Sr 26.470, 3/4) - yes, FTA and a combination of "NOW (TV)" plus Japanese documentaries, pop music and "Internet style" news and features.



Optus B3/156E: Zee Australia and NZ has appeared on 12.532Vt, Sr 30.000, FEC 2/3 with 6 channels NOT including Zee English nor Zee English movies (Aurora channels 54 - 59). Contacts in Australia are 133-036 (or 02-9419-8522) and New Zealand is (09) 627-4933; dish size, 85cm, installer is Comet, "formal service" scheduled to begin 15 August.

WITH THE OBSERVERS: Reports of new programmers, changes in established programming sources are encouraged from readers throughout the Pacific and Asian regions. Information shared here is an important tool in our ever expanding satellite TV universe. Photos of yourself, your equipment or off-air photos taken from your TV screen are welcomed. TV screen photos: If PAL or SECAM, set camera to f3.5-f5 at 1/15th second with ASA 100 film; for NTSC, change shutter speed to 1/30th. Use no flash, set camera on tripod or hold steady. Alternately submit any VHS speed, format reception directly to SatFACTS and we will photograph for you. Deadline for September15th issue: September 3 by mail (use form appearing page 34), or 5PM NZT September 4th if by fax to 64-9-406-1083 or Email skyking@clear.net.nz.

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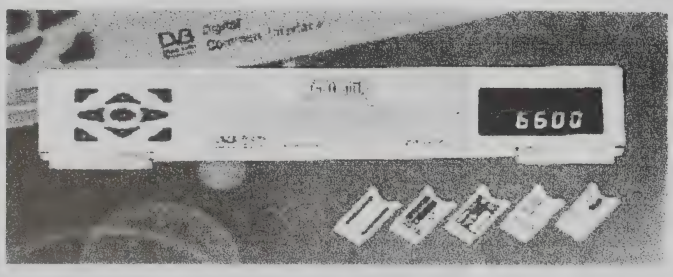

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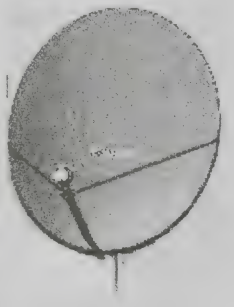
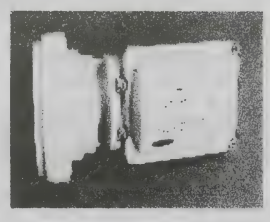
Digital +Ana+Posnr +CI	LGI2000CIAP

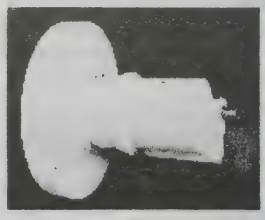


45 ~ 180cm Ku dishes

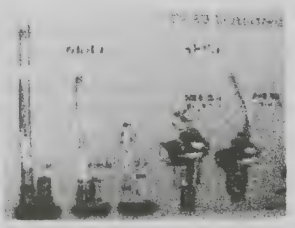
Offset dish mounts



Autosat Ku LNBF



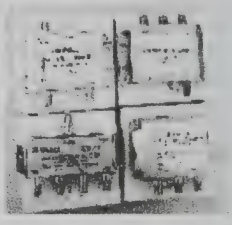
Autosat C LNBF-dual



12"/18"/24"/36" heavy duty /regular actuator

Positioner

Video Sender with Remote extender



Multiple switches

Autosat = quality*(product+service+price)

Familiar Name - strange place

NZ enthusiast Steven Mckelvie, employed by a major telecommunications firm but calling Napier "home base," is in Dallas, Texas attending an extended educational course. He writes:

"I purchased a DirecTV system from Radio Shack for (US) $99.95. The salesman explained there was a 5 week wait for installation (wow - are they behind!) and I insisted on doing it myself. I bought their install kit (half the dish price), bolted the dish to my balcony (see photo), powered up the RCA receiver, went to a dish pointing menu where I entered my (postal) zip code. It gave me the elevation and azimuth (scales are on the dish) and an audible tone which went higher and higher as the signal was peaked. Then rang a customer service centre, gave them model & serial number and access card number. Within seconds I had pictures on the channels ordered. For US$29.95 I have around 100 channels, plus they threw in movie and sport channels for the first month as a bonus. Boy, have they got it easy over here!"

Imagine a 5 week wait for an install. Imagine 100+ channels for A$48 per month. *Imagine - imagine -*

Palapa C2M/113E: Channel News Asia is back - on 4071/1079Hz, Sr 14.030, 3/4 (VPID 33, APID 34).

PanAmSat PAS2/169E: California bouquet (3901/1249Hz), which did play on UEC 742, then did not, does again. Most intriguing here - of 9 channels - is BBC FTA NTSC with Japanese audio on soundtrack 2-R, and, Bloomberg Radio on soundtrack 2 - L.

PanAmSat PAS8/166.5E: California Bouquet (3940/1210Hz) played sometimes, for up to a week, on UEC 642. TARBS second transponder, 12.606Hz, Sr 28.067, 3/4, now includes ESPN. Channel J added to NHK bouquet, English, FTA (D. Pemberton). A JEDI (TVB) 11 channel bouquet now on 12.686Hz, Sr 28.124, 3/4 Irdeto.

PanAmSat XX/170E: They have asked the Australian Communications Authority for permission to lodge a new satellite at this location - obviously would have to be replacement for PAS-2, or, be Ku only operating outside of present 12.25 - 12.75 region.

TeleKom 1/107E: CNBC Asia is running FTA on 3580/1570Hz, Sr 8.000, 3/4 is FTA where strong enough.

Thaicom 3/78.5E: DD18 Punjabi has replaced DD1 National, 3800Vt PAL. MRTV appears to have left 3666Hz, MPEG. 3550/1600Hz, 3-Angels Christian TV from USA Sr 13.330, 3/4 (D. Leach, NSW). Sony Entertainment testing on 3600/1550Hz, Sr 26.662, 3/4 FTA.

Errata: Dutch telecaster BVN-TV seeking advice on how to reach NW and Australia with 24 hour service; contact Arjan Meliesie as arjan.meliesie@rnw.nl.

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AT Sign-off

The CMT PAS-8 debacle

With modest advance warning, on July 19th, Country Music Television (CMT) left PAS-2's California Bouquet for PAS-8's similar bouquet. A significant number of Scientific Atlanta D9223 IRDs, authorised for CMT and paying their subscription fees, have lost service. It happened that our Far North Cable TV Ltd. cable system was one of those.

Here are the symptoms. When you re-enter the PAS-8 installation numbers for the California bouquet, you get signal lock, a suitable BER and AFC but when leaving set-up menu channel zero (0), the signal acquisition green LED goes out and there is nothing on the screen but the "no signal" text.

A check list. Go to the installer set-up (Menu, 2, 9). Make sure it is on C-band 3940 or C/L-band 1210. If not, push "next" and watch cursor move to that line and re-enter the correct numbers. Then press NEXT which moves cursor to FEC; use channel up button to change to 7/8. Similarly enter 27.690 for symbol rate, H for polarisation (not essential unless you are using a voltage switching LNB driven by this receiver), RF (input selection). And press "yes" which will save the new data.

Now press "user" keypad button which takes you to page 2 of the installation menu. Set up as follows using next button to toggle down: (1) 5 seconds, 8002 for network ID (several missed this one), (3) 1 for the bouquet ID, (4) video standard to 525:NTSC>PAL/B, (5) use channel up and down to select "N/A" for search/find. The next step may not applicable to older IRDs: (6) I-Q Select goes to "Auto Sw/Delay: Fixed Delay" using channel up and down buttons. (7) MPEG Output goes to "unfiltered," (8) 5.150 for LO C-band, (9) 11.300 for the Ku low/single LO, (10) same for Ku High Band LO, (11) 11.700 for Ku band switch. And press the "yes" button to save all of this.

Bored yet? The fun has but begun.

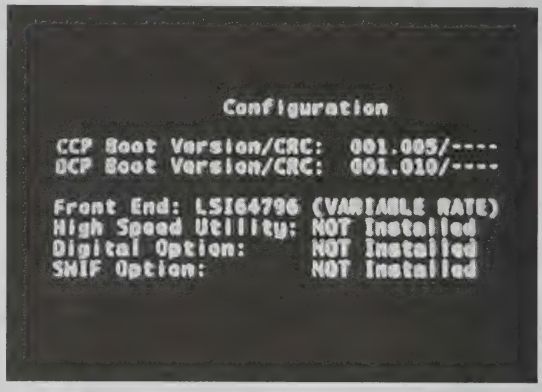
PAS-2 California Bouquet has variously switched back and forth between MPEG (as in compliant) and DVB (as in PowerVu only) for the past several months. During June, for example, UEC 642s would load the PAS-2 bouquet while it was running as an MPEG compliant transponder. PAS-8, on the other hand, has only rarely been MPEG. So ...

Now enter in sequence **m**enu, **u**ser, **n**ext, **y**es and keypad number "**6**." This produces a menu which at the bottom says "User:XXXX." The "XXXX" can say MPEG, DVB, PED PES, PowerVu or something else. If it says MPEG, the entire IRD is only receptive to MPEG signals. If it says DVB or PowerVu, it is receptive to PowerVu's unique format. If you push "user" until the line says "User MPEG" and then "yes," you *should* find EWTN and the EB Net will play as FTA signals from the California bouquet of PAS-8. Channel numbers will be 1 through 7, 8, 9 or 10 - a function of your software age.

Reader Steve Jepson of Levin, NZ found he could move his D9223 to the PAS-8 ESPN bootloader transponder (4020/1130Hz, Sr 26.470, 7/8), channel up to number 11, and

Program: 0 Fixed PES PIDs
1) Video 4096
2) Audio1 4097
3) Audio2 0
4) Audio3 0
5) Audio4 0
6) Utility 0
7) NS Data 0
8) PCR 4097
9) VBI 0
USER) Tune mode: DVB
Press a # to select field
Press 0 to restore saved data
Press YES to save program
PID #'s are in decimal
Press VIEW to watch TV

IRD must be in DVB tune mode (above) to do OS upgrade; Front End must be (variable rate) version or download is not possible. Want yours fixed? Email josma@panamsat.com.



in about three minutes time the software in his IRD was renewed with the latest PowerVu data stream. Until he did this, his CMT authorised decoder did not work on PAS-8 (it did work on PAS-2). Several other readers have a similar report. But - once the software is upgraded in this fashion, FTA service EWTN on the same transponder quit working!

We spent a total of 7.8 hours on the telephone with PanAmSat, Scientific Atlanta and CMT personnel trying to sort out our particular IRD. We learned ours had the original software, that it was one of the first 100 D9223 units shipped, and after five attempts to send an "OS Download" (upgrade of our software) to our IRD using a special PAS-8 frequency set-up just for upgrading our unit, SA's D9223 guru Albert Illo threw in the towel.

"*Your unit has spectrum inversion*" he decided. "*This is a software bug that crept into a 'few' of the first units. Frankly, I don't understand how after four years of upgrading which should have corrected this problem your unit still has the original software. Has it been stored in a box until recently?*"

Actually, no. It has been in use four years continuously. "*Which*," Albert told us, "*means that CMT has failed to pass on to your unit the automatic upgrades which should have corrected this years ago. Fortunately, there are very few like yours left out there.*"

Wrong. In our quest to get ours fixed, we found eight more with the same problem in NZ and Australia. Ours is now back in Toronto getting an "internal upgrade." Yours? *See above.*

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OBSERVER REPORTING FORM - Due September 4, 2000

• NEW programming sources seen since August 1st: _____

_____

• Changes (signal level, transponder, programming content) in pre-existing programming sources since August 1st: _____

_____

• OTHER (including changes in your receiving system): _____

_____

NOTE: Please use P1 - P5 code when describing signal levels and receiver IF/RF settings.

Your Name _____

Town/City _____ _____ _____

Make/size dish _____ LNB _____ Receiver _____

Your email address _____ **if you have one!**

RETURN: SatFACTS, PO Box 330, Mangonui, Far North, NZ, fax 64-9-406-1083, Email Skyking@clear.net.nz

What would YOU like to see changed in IRDs???

One of the most thought provoking sessions during SPRSCS 2000 was a Garry Cratt led hour seeking to identify where MPEG-2 IRD designers/manufacturers "go astray" by bungling their software, or hardware designs. A list of 20+ "suggested changes" resulted and is shown in detail in SatFACTS for this month (page 6) as well as forwarded in videotaped format from SPACE Pacific to receiver manufacturers. NOW - it is **your** turn. Suggest to us some changes YOU would like to see in future generation IRDs!

1) _____

_____

2) _____

_____

3) _____

_____

4) _____

_____

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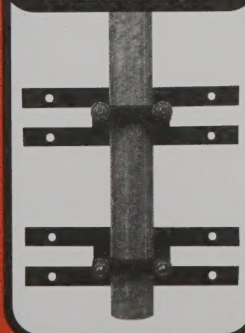
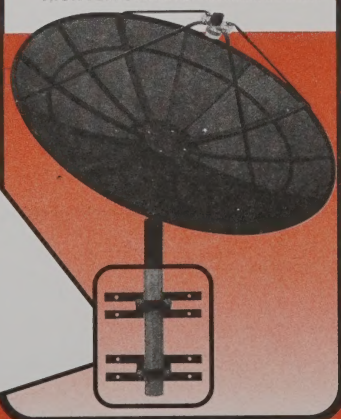
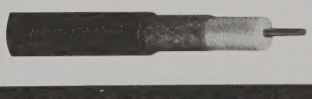


PSi
HIGH PERFORMANCE ANTENNA DISH



AVAILABLE IN

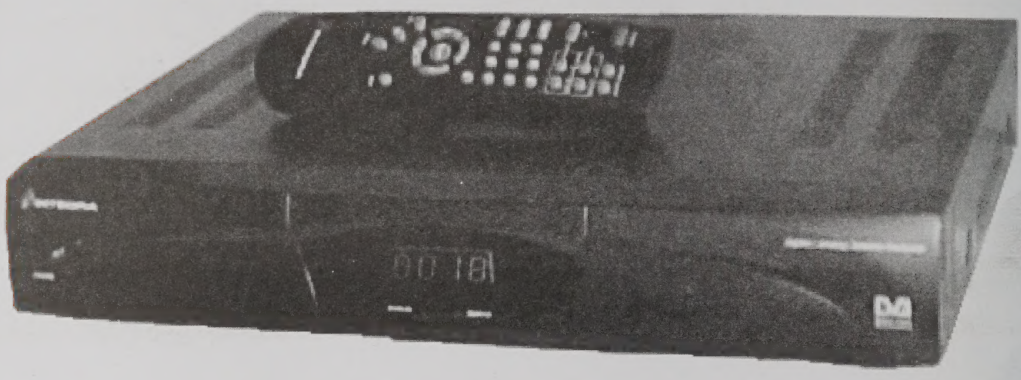
- 1.95m Quad Fixed mount
- 2.3m Quad Polar mount
- 3.1m Quad Polar mount



RG6 Tri shield 300 and 100m ACTUATOR CABLE AVAILABLE

Integra IT-640S

Full featured digital / analog / positioner satellite receiver



General

- 3-SCART connector, RCA outputs, channel selectable 21 - 69 UHF Modulator
- OSD : Transparency & Blending, 256 colors
- Front panel keys & IR remote control user interface
- RS232C port for updating control software and additional service
- DiSEqC LNB, 13/18V, 0/12V, 0/22KHz tone

Common Interface

- DVB Common Interface (Viaccess, Nagra Vision, Conax, CrytoWorks,Irdeto,)

Digital Receiver

- QPSK tuner
- Digital tuner with loop-through
- SCPC/MCPC receivable from C/KU-band satellite
- Multi-language function(menu, audio)
- Supports DiSEqC1.0
- Last channel memory function
- Teletext By VBI
- Editing Functions (TV or Radio Channel, Channel Name, PID, Transponder name)
- EPG for on screen channel information.
- 5 Operation modes(Digital TV, Digital radio, Analog TV, Analog radio, Favorite)
- 3100 programmable Channels(Digital 3000, favorite 100)

Analog Receiver

- 500 programmable Channels
- 2-input analog tuner
- GUI Analog Menu
- Multi step low threshold function
- Adjustable video bandwidth 18/27MHz
- Adjustable Audio Bandwidth130 - 600kHz

Positioner

- Built-in Positioner
- Mechanical Polarizer
- Channel storing for multi-satellite(up to 64)

These quality products distributed by:

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